AMERICAN SCHOOL AND UNIVERSITY

1958-59 30th Edition

VOLUME I

SCHOOL PLANT REFERENCE

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About this 1958-59 edition

We take pride in continuing our policy of developing the AMERICAN SCHOOL AND UNIVERSITY yearbook as a comprehensive reference guide with much timely and important information involving school and college plants. In Volume I of this 30th edition we present an array of articles on planning, financing, designing, equipping, maintaining and operating school and college plants.

You will find that Volume II is a well organized purchasing file which offers help in selecting building products, furniture, equipment and supplies of all kinds.

Both of these volumes contain valuable aid for school planners everywhere. We hope you will use them often; they are at your service.

Walter D. Cocking, Editor

Two volumes, $10.00

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VOLUME II PURCHASING FILE

THE YEAR IN REVIEW

SCHOOL AND COLLEGE administrators continue to accelerate efforts to obtain first rate structures to house expanding enrollments. Improvements in the quality of both construction and program have combined to produce results of a tangible and noteworthy nature. The inventive talents of architects and educators in planning and designing economical buildings that avoid cheapness deserve the praise and recognition of the whole nation.

In looking back over the past year of school and college construction progress, we appreciate the tremendous volume of time, energy and expense involved. The resulting new buildings are a tribute to America's response to today's almost insatiable demands for more and more school plant facilities of all kinds.

Ace Hoffman Studios

In 1957 the colleges of the country constructed 919 new buildings at a total cost of 555.7 million dollars. Adding to the total of new science structures is Harold R. Stark Hall at Wilkes College. Lacy, Atherton and Davis, architects.

EDUCATIONAL BUILDING IN 1957

by THE EDITORS

American School and University

FOR the first time since 1949 the post-war trend of year to year increases in the volume of new school buildings constructed throughout the United States has not been maintained. The annual educational building survey of the AMERICAN SCHOOL AND UNIVERSITY for 1957 reveals record total expenditures for new educational buildings, but construction volume is down, except for private schools. This means that America spent more money for fewer buildings. The urgent need for public school and college construction has not diminished, despite the efforts of many institutions and communities to alleviate the shortage of physical facilities of all kinds.

Total Educational Building

A total of 9,689 educational buildings was constructed during 1957 at an expenditure of over 3.4 billion dollars. For the first time in the nine years of this survey the number of new buildings erected failed to show an increase over the previous year, being 386 buildings less. Expenditures, however, rose by some 200 million dollars over the figures for 1956, indicating, perhaps, the inflationary character of our nation's economy. Construction for the nation's private elementary and secondary schools revealed an increase both in numbers and dollars, while junior college figures disclosed decreases in both. Public school and college construction followed the general pattern of a decline in number of new buildings, with an increase in expenditures.

Public School Building

The volume of public school construction has declined, as compared with figures for the past nine years. A total of 7,841 buildings was constructed in 1957,

All Educational Building — Number and Cost by Region
(Public, Private, Junior College, College)

Region	1955		1956		1957	
	Number	Cost	Number	Cost	Number	Cost
South	3016	$ 617,752,236	3062	$ 598,080,567	2753	$ 575,437,227
New England	354	138,345,513	519	203,395,684	558	268,828,641
Central	2750	841,968,304	3043	1,069,019,747	3315	1,155,089,676
Middle Atlantic	1251	910,004,876	1186	658,400,084	1153	792,559,973
West	1875	520,271,648	2265	685,478,514	1910	628,593,817
TOTALS	9246	$3,028,342,577	10,075	$3,214,374,596	9689	$3,420,509,334

while there were 8,211 new buildings in 1956. The decrease in volume did not precipitate a decline in expenditures, and 100 million dollars more were spent over 1956 cost figures. Only 10 percent of total public school buildings were constructed in the Middle Atlantic states, yet these same states accounted for 24 percent of the total expenditure. By contrast, the South spent only 16 percent of the money while constructing 29 percent of the buildings. Central states once again were well ahead in both the number of new buildings constructed and dollars spent.

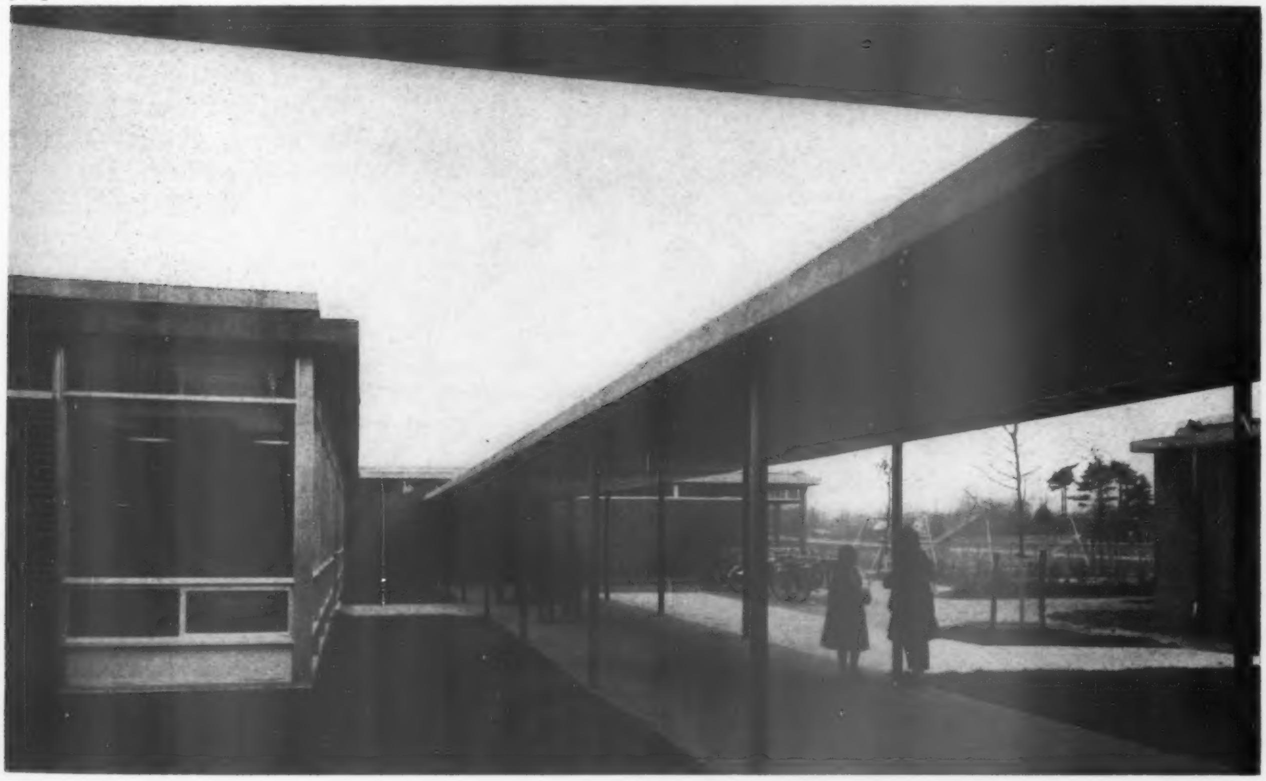
Almost two-thirds of the total public school construction for 1957 were elementary school buildings, 30 percent were secondary schools and 6 percent were combination facilities. These figures reveal a decrease in the construction of combined elementary-secondary buildings from the 1956 figure of 10 percent. Half of the 2.64 billion dollars spent on public school construction was for new secondary schools.

Private School Building

Expenditures for private elementary and secondary school construction during 1957 increased markedly over previous years. Of the 169 million dollars expended, more than half of the amount provided 349 new secondary school buildings, one-third of the cost financed 309 new elementary schools, and 12 percent was spent for 63 combination elementary-secondary

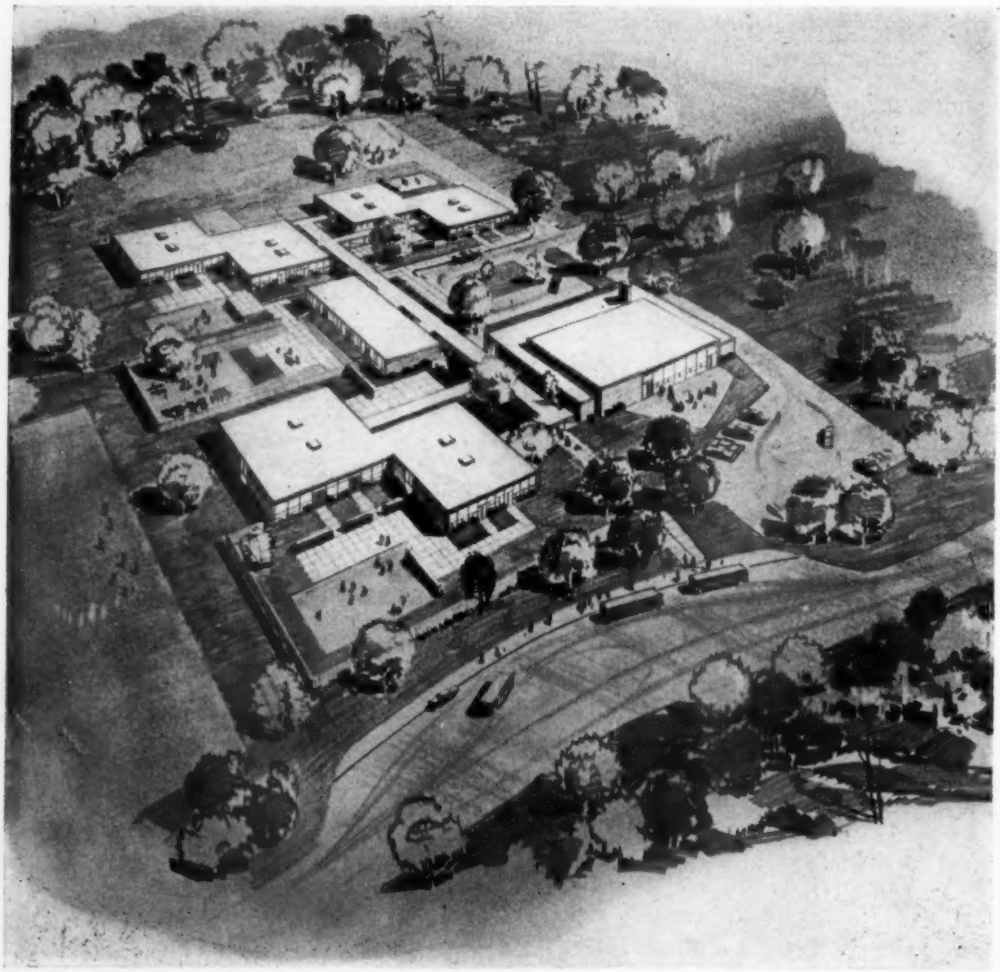
Joseph W. Molitor

Elementary school buildings accounted for almost two-thirds of the total public school construction for 1957. Clover Street Elementary School, Windsor, Connecticut, is one of the 5013 constructed. Warren H. Ashley is the architect.



Public School Building — Number and Cost by Type of School

Type of School	1955		1956		1957	
	Number	Cost	Number	Cost	Number	Cost
Elementary	5004	$1,131,111,021	5052	$1,143,586,068	5013	$1,189,823,160
Secondary	1978	1,118,180,890	2374	1,180,278,112	2321	1,321,194,077
Combination	854	190,749,797	785	223,708,740	507	134,293,448
TOTALS	7836	$2,440,041,708	8211	$2,547,572,920	7841	$2,645,310,685



Clover Street Elementary School is a compact cluster plan on a 15 acre site. The adjoining clusters contain four classrooms each. There is also a multi-purpose room. Costs of this building amounted to $993,753.

Public School Building — Number and Cost by Region

Region	1955		1956		1957	
	Number	Cost	Number	Cost	Number	Cost
South	2604	$ 483,959,212	2593	$ 445,632,417	2278	$ 422,609,746
New England	238	93,747,530	378	164,450,790	370	199,283,909
Central	2427	682,761,807	2611	836,184,054	2824	896,185,623
Middle Atlantic	1010	808,968,649	764	526,183,279	764	631,392,953
West	1557	370,604,510	1865	575,122,380	1605	495,838,454
TOTALS	7836	$2,440,041,708	8211	$2,547,572,920	7841	$2,645,310,685

Private School Building — Number and Cost by Region

Region	1955		1956		1957	
	Number	Cost	Number	Cost	Number	Cost
South	56	$ 9,552,692	48	$ 8,969,897	137	$ 29,968,099
New England	27	2,140,899	86	13,455,545	122	29,855,437
Central	105	22,403,879	66	21,941,695	162	38,832,062
Middle Atlantic	83	19,963,405	248	51,792,499	235	61,384,308
West	100	6,946,639	98	8,285,147	65	9,387,092
TOTALS	371	$61,007,514	546	$104,444,783	721	$169,426,998

Junior College Building — Number and Cost of Building by Region

Region	1955		1956		1957	
	Number	Cost	Number	Cost	Number	Cost
South	100	$14,660,189	129	$19,115,434	76	$14,954,617
New England	8	1,036,722	10	1,912,524	13	1,862,615
Central	36	8,085,200	52	14,345,422	36	7,898,106
Middle Atlantic	10	4,425,596	19	4,908,754	18	6,489,142
West	71	16,570,892	96	20,320,428	65	18,787,297
TOTALS	225	$44,778,599	306	$60,602,562	208	$49,991,777

schools. The volume of construction rose from 546 total buildings in 1956 to 721 in 1957.

Private school construction declined slightly in the Middle Atlantic states of the nation, and decreased sharply in the West. This was more than off-set by construction increases in other areas. The South for instance, almost tripled its volume, the New England states increased the volume of construction one and a half times, and the Central states added almost two and a half times as many new buildings as had been erected in 1956.

Junior College Construction

The upward trend in junior college construction which began in 1953 became a downward slope in 1957. While 306 new buildings were provided in 1956, only 208 were constructed in 1957. The outlay of 49.9 million dollars in 1957 was also short of the 60.6 million dollars spent in 1956.

More Dormitories Rise

More dormitory residences, academic classrooms and science buildings, respectively, were added to junior college campuses than other types of structures. One of every five new plants was a dormitory, accounting for one of every five dollars spent for new facilities.

There is no apparent explanation for the sharp decrease in junior college construction, a decrease which

Utility alcove, adjoining the classroom of the Clover Street School contains work counters, a sink, stove and refrigerator.

Joseph W. Molitor

is surprising when measured against the increasing demand for education beyond the high school.

College and University Construction

Construction on college and university campuses in 1957 paralleled the junior college situation. In 1957 colleges erected 919 buildings at a cost of 555.7 million dollars. In 1956, 1,012 buildings were constructed at the lesser cost of 501.7 million dollars. Despite a reduction from the previous year of almost 100 college and university buildings for 1957, the amount spent for this construction exceeded the 1956 total by approximately 54 million dollars.

It might be noted that the three types of building most frequently being provided on college and university campuses are the same three receiving priority in junior college construction–dormitory-residences, academic classrooms and science buildings. These facilities accounted for almost half of the new college and university buildings and two-thirds of the total cost.

College enrollment at the end of 1957 was 3,450,000 students. It has been estimated that this figure will exceed five million by the end of 1967. In light of these enrollment predictions, any downward trend in college construction appears to be the harbinger of a major crisis in the college building situation. An up-swing in construction seems mandatory if the demands placed on colleges and universities by burgeoning enrollments are to be met.

Factors Which Influence Construction

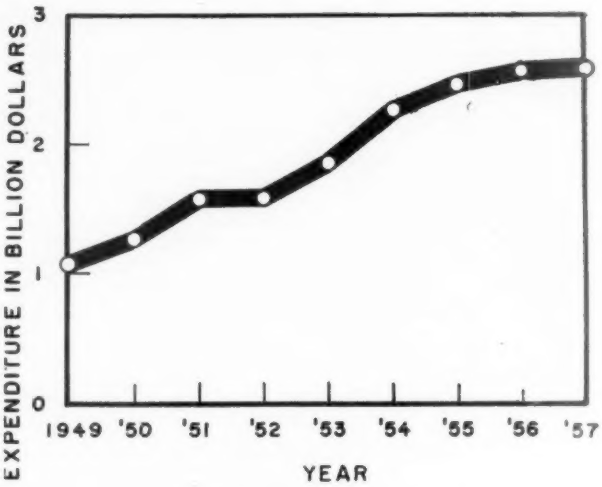
Phenomenal Population Growth

Our rapidly expanding population has been a potent force for impelling the construction of more and more new educational buildings. In 1950 the population of the United States was 150.7 million. In 1958 it is more than 172 million and gives evidence of climbing to a point beyond 300 million by the year 2000. Public school enrollment was 25.5 million in 1950. By 1957 it had risen to almost 33.5 million. It is estimated that public and private elementary and secondary enrollments will exceed 42.5 million by 1960. An even greater percentage of predicted growth is assured for colleges and universities.

A concomitant of the growth in population has been its increasing mobility. Urban areas have exploded their inhabitants outward and the resultant suburbias have become home for many families with children. New schools have had to be provided almost overnight. Quiet suburban and semi-rural areas have been rudely awakened by hosts of newcomers, with the result that existing school plants are found to be both insufficient and obsolete.

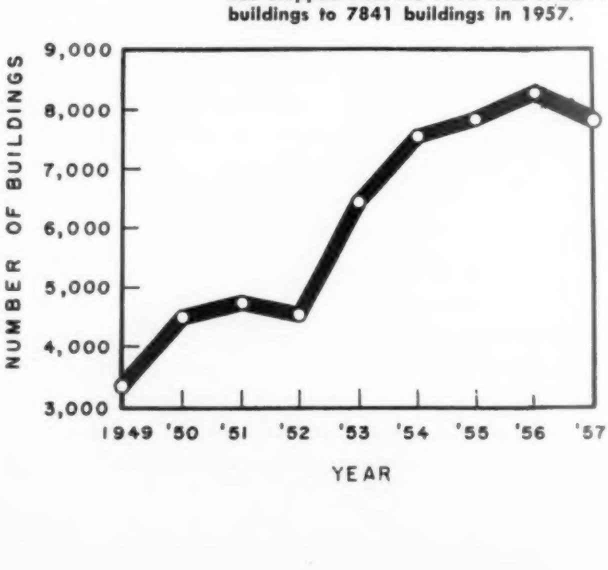
Small rural districts, plagued with uneconomical school organizations and inadequate facilities, have consolidated their resources, and new regional and union schools have come into being. Other cities, towns and villages, not quite so hard hit by the increase in numbers of children, nonetheless have begun to note the obsolescence of their existing school buildings. Communities were reminded that many of their schools, built prior to World War I, had not been originally planned with desirable educational specifications as a guide for construction. Thus, an expanding and mobile population and an awareness of the inadequacies of present school buildings have forced the demand for construction of new educational facilities.

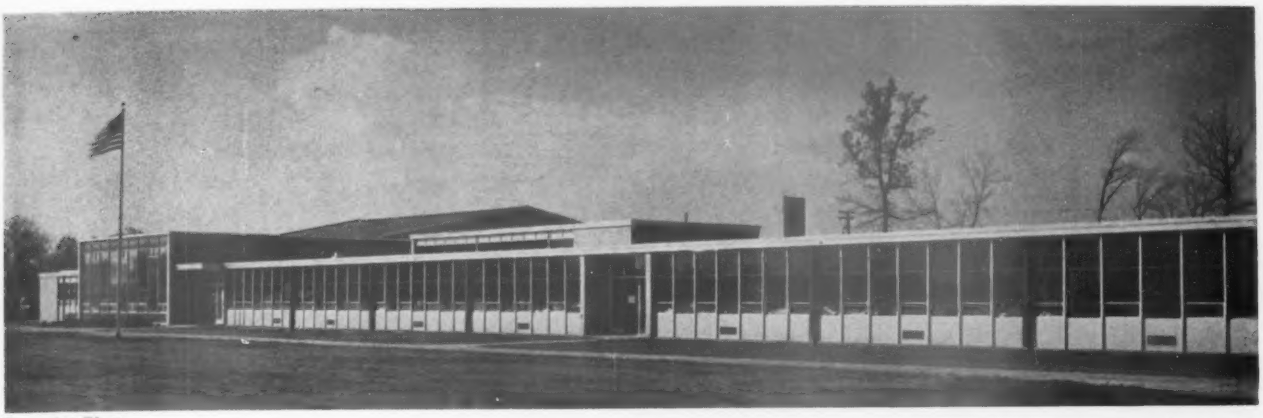
To compound the situation, more young people are staying in school longer. Increased productivity and the variety of skills needed for our working force have meant that students remain in school longer to absorb whatever preparation is needed for today's labor market. Also, more persons are entering college and, therefore, remain in secondary school to complete college prepara-



Total expenditures for public school construction are shown for the years 1949 through 1957. Volume of expenditures has risen slightly, from 2.5 billion in 1956 to 2.6 billion in 1957.

Total number of new buildings constructed for public schools of the nation has dropped from the 1956 total of 8211 buildings to 7841 buildings in 1957.





Lens-Art Photo

A total of 2321 secondary schools was constructed during 1957. Lamphere High School, Madison Heights, Michigan, has aluminum window walls, brick trim and porcelain enamel spandrel panels. H. E. Beyster & Associates, Inc., architects.

tory courses. All this adds up to more students, less available facilities.

The School Finance Picture

School construction has hit an unparalleled high during the last few years, and the problem of financing such construction has become a real challenge to the nation. Using 1939 as a base of 100, the index of school building costs rose to 170 in 1947 and to 226 in 1957. However, in the past twenty years the cost of school buildings has increased 150 percent, while the cost of all buildings rose 210 percent, and the cost of general construction increased 275 percent.

During 1957 the interest on school bonds reached a 28-year high. In February the average interest rate was 3.5 percent. By September it had jumped to 4.14 percent. Nevertheless, by the end of the year the rise in school costs halted momentarily, and through January of 1958 had even declined slightly. The interest rate on school bonds dropped an average of three-tenths of one percent as the Federal Reserve Board lowered interest rates on borrowing.

Faced with mounting bonding costs and statutory limits on the amount of bonded indebtedness, many communities turned for assistance to the state and federal governments. The defeat in Congress of the Kelley Bill squashed hopes for federal aid for school construction in the near future, but state legislation passed in 1957 has given help in some cases.

Alabama voted a 150 million dollar program. Connecticut augmented its grants to equal one-half the cost of construction. Funds made available in Florida and Washington on a matching basis amounted to 23 million and 52 million dollars, respectively. Ohio, Tennessee, Vermont and Wyoming also voted aid for school building construction.

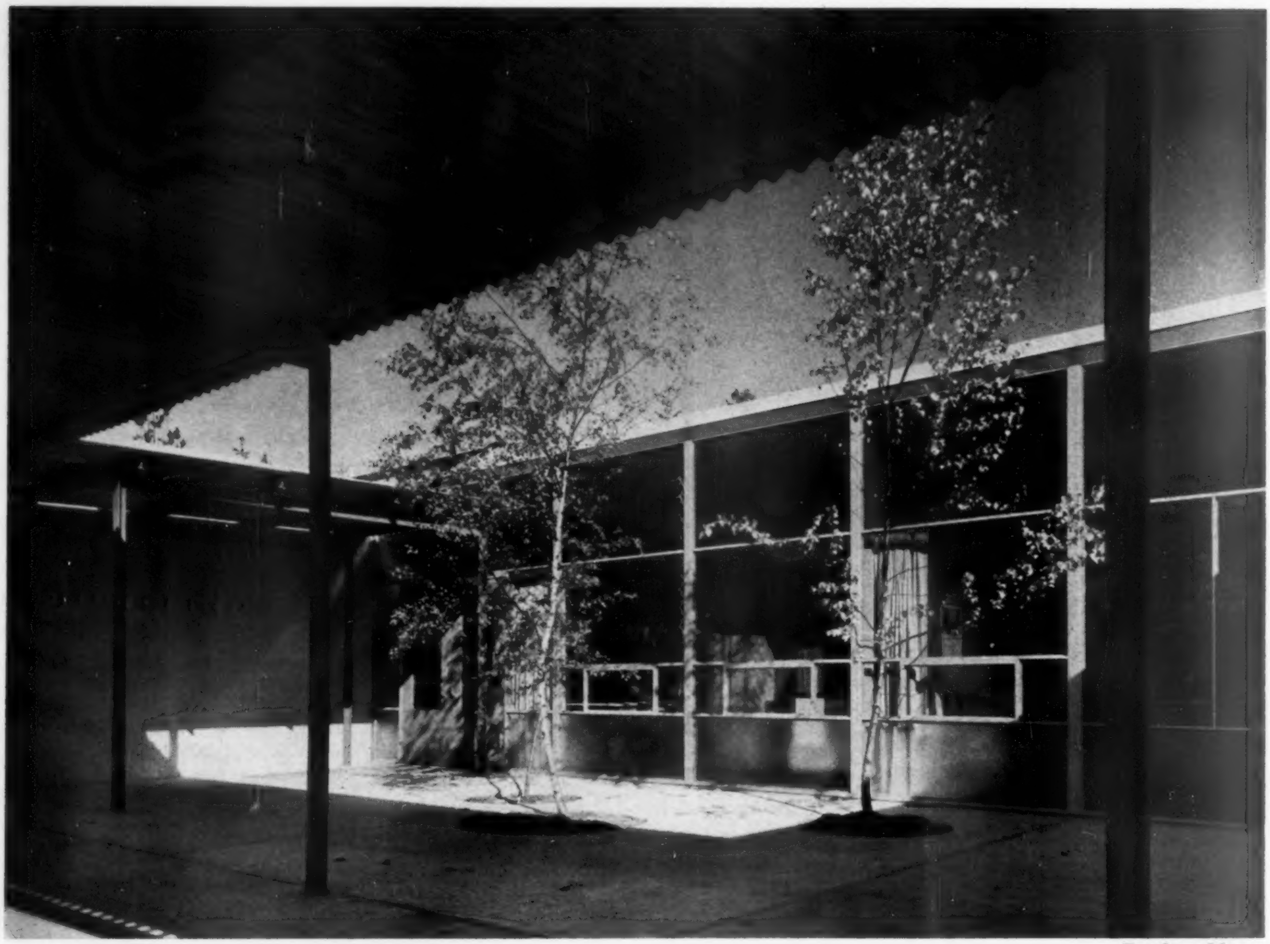
Much of public school and college construction is financed by bond issues based on property taxes available. The inadequacy of this method to provide sufficient funds becomes more and more apparent. Definite and widespread policies of federal and state support are needed to bolster local financing methods.

College Buildings Constructed in 1957

Type of Building	Number	Cost
Academic Classrooms	99	$ 55,803,905
Administration	13	4,358,195
Agriculture	40	10,154,221
Auditorium-Chapel	21	15,640,703
Dormitory-Residence	349	237,085,967
Engineering	18	15,407,946
Food	34	16,639,744
Health	17	15,071,851
Library	54	33,425,895
Music	20	9,458,366
Physical Education	60	26,887,339
Science	94	70,738,611
Service Facilities	41	8,487,288
Student Center	49	32,340,972
Vocational-Commercial	10	4,278,871
TOTALS	919	$555,779,874

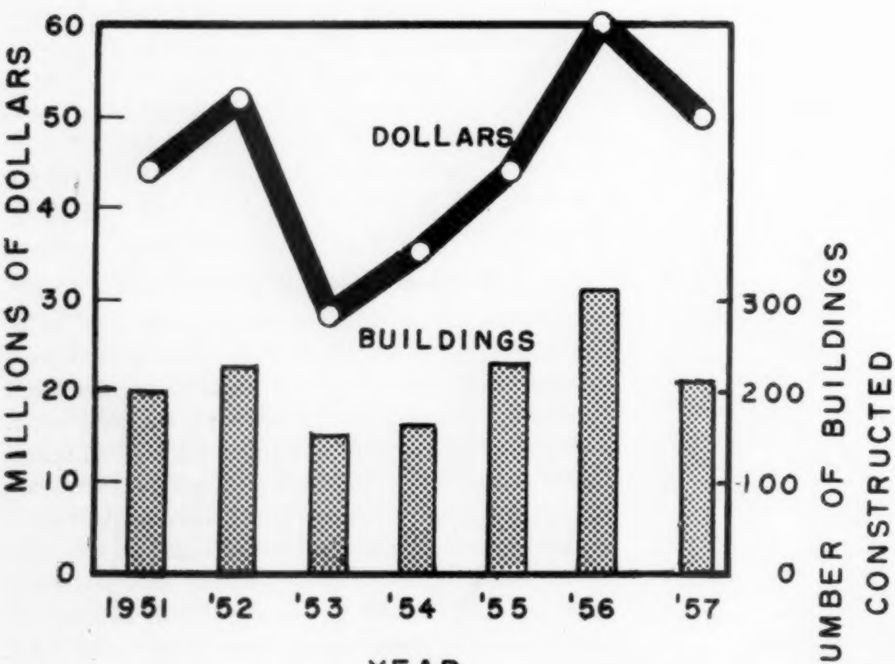
Various Community Reactions

Community reactions to demands for new buildings varied, but it was found that voters in 1957 were not approving bond issues with their former readiness. In 1956 voters approved 93.2 percent of the bond issues, if the figure is based on the dollar value of all school bonds proposed. In 1957 only 85 percent were approved. Voter resistance to bond issues is particularly evident, however, when figures are based on the number of issues involved. An approval of 85.4 percent in 1956 fell sharply to 68.2 percent in 1957. Despite this decline, school bonds are not faring too badly when compared to the overall approval tallies for municipal



Dearborn-Massar

Paved court is at entranceway of the administration and library units of the Woodway Elementary School, Edmonds, Washington, Waldron & Dietz, architects. Covered walkways connect areas of the school.



Junior college construction has shown a marked decline from the 1956 totals. Costs declined from 60.6 million dollars in 1956 to 50 million dollars in 1957. Volume of new buildings also dropped from 306 structures in 1956 to 208 structures in 1957.

bond issues. Based on dollar value, municipal bonds dropped from 91.6 percent approved in 1956 to 81 percent in 1957.

Milwaukee, Wisconsin, passed a 39 million dollar bond issue, marking the third time in six years that the city's voters have said "yes" to funds for school construction. After years of indifference and failure, Oskaloosa, Iowa, finally passed a bond issue due mainly to the adamant efforts of a Mothers Committee for Better Schools. Citizens in Williamsville, New York, voted "no" to funds for a new junior high school in March, but reversed themselves in September, passing the proposal two to one.

In keeping with the trend in voter resistance, however, Mt. Vernon, New York, failed to pass a bond issue for the fourth time in seven years. The Long Island communities of Glen Cove, Roslyn, Woodmere-Hewlett and Long Beach have all said "no" to funds for the construction of new schools. A school building committee in Norwalk, Connecticut, was accused of indifference to general needs of the town, and became a target for the opponents of new educational facilities.

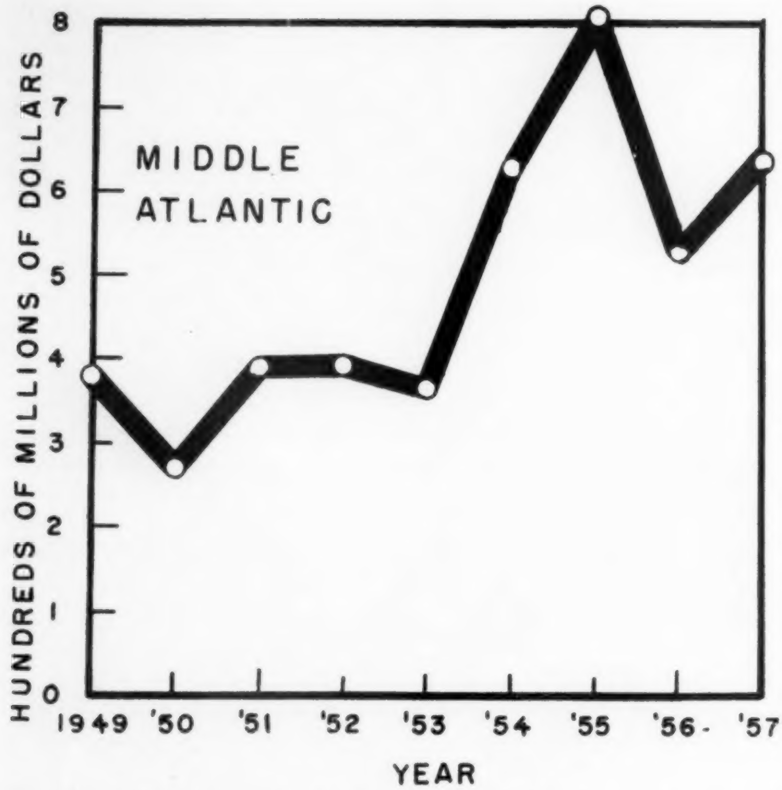
A Concern for Economy

Whether or not the public approved funds for school construction, it was evident that a general concern for economy was dominant. People everywhere were asking that the items requested be clearly justified. The pros and cons of proposed facilities were hotly debated, as were questions of educational philosophy.

Distributive education is taught in a well lit classroom in the New Kensington, Pennsylvania, High School designed by architects Hunter, Campbell & Rea. Display cases and counters are available for class use.

Photos by The Claar Studio

Homemaking suite of the New Kensington High School includes round expansion tables for dining, work counters with storage beneath, and wall cabinets. Various kinds of stoves are provided.



Rising costs for new public school construction are particularly evident in totals for the Middle Atlantic states. Costs rose from 526 million dollars in 1956 to 631 million dollars in 1957.

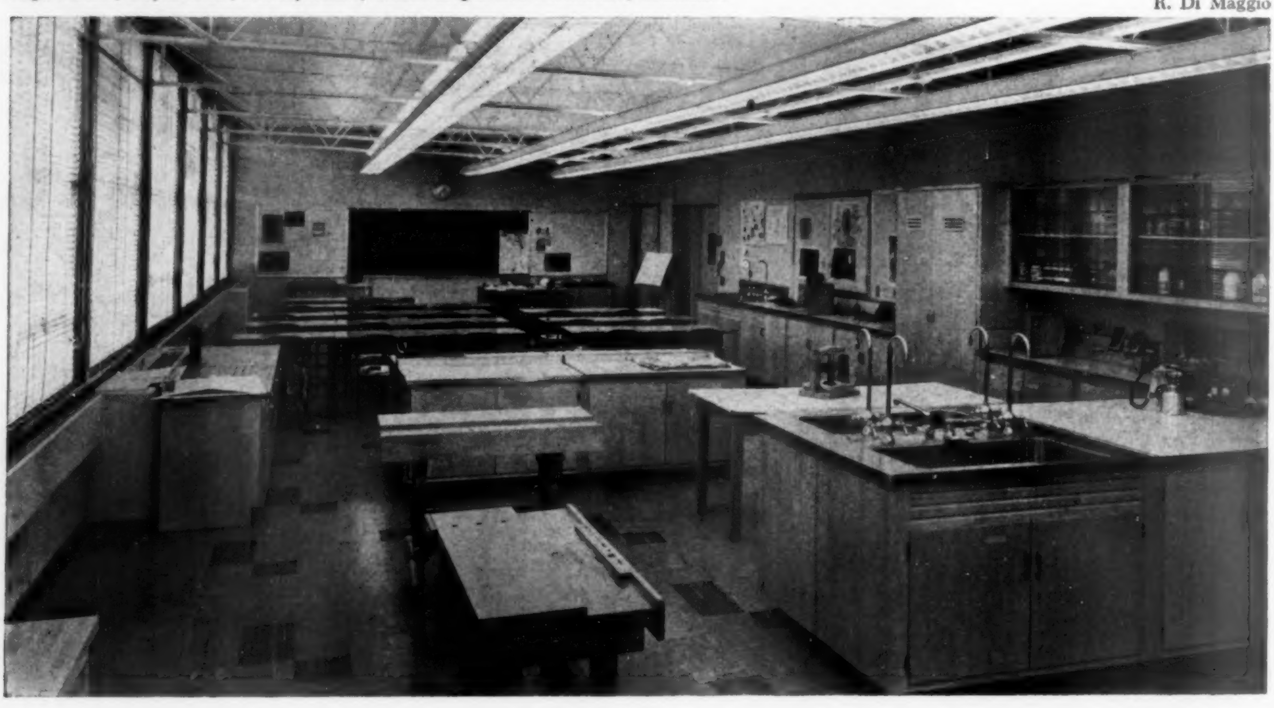
Boards of education, school administrators and interested citizens continue to seek ways to provide satisfactory yet economical school buildings.

Sometimes the drive for economy has produced "cheap" and inadequate structures. In contrast, real economies have come about through careful and deliberate planning. Communities have organized their resources to estimate the future growth of their school districts, they have purchased future sites, and have planned immediate structures with an eye to the possibility of future changes. Some communities eliminated what they considered to be "frills," and it was not uncommon to find one district dropping a proposed swimming pool for this reason, while another included it as an essential and desirable educational facility.

Architects have cooperated in the drive for econ-

Sinks and counters are part of equipment in the art room of the Lenape Junior High School, Doylestown, Pennsylvania, Micklewright and Mountford, architects.

R. Di Maggio



Art Hupy

Another new elementary school for the State of Washington is the Island Park School in Mercer Island. Bassetti & Morse, architects of Seattle, designed the school. View here is the interior court.

omy by designing buildings which require few variations in the sizes of component parts, and thus permit the use of stock sizes and prefabricated parts. Other economies through design have resulted from judicious selection of structural and finish parts.

Financing College Structures

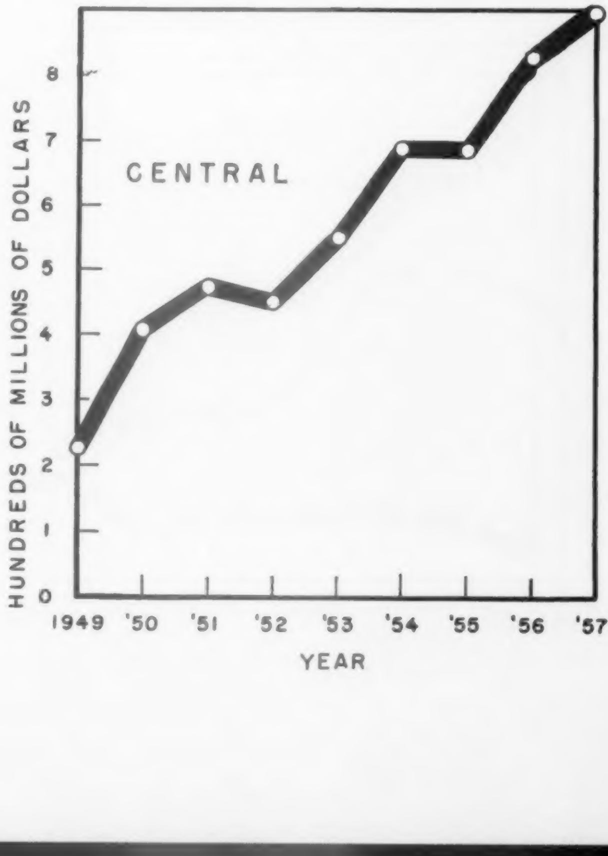
While the increase in public school construction has been more dramatic, colleges and universities are also faced with a need for additional buildings. This need, it is anticipated, will become paramount as college enrollment increases. The financing of college structures is accomplished in various ways. More college residence halls have been built than any other type of structure, partly because the need is so great and partly because these buildings are self-amortizing. Colleges realize a steady, controlled income from dormitory accommodations. The federal government has made funds available for college housing, and seven states have added to appropriations for the construction of new buildings at state universities and teachers colleges. Florida alone voted eight million dollars for junior college construction.

Private institutions of higher learning rely heavily on gifts from friends and alumni, as well as from industry, to help finance new construction. Professional fund raising groups are often employed for this purpose.

Planning College Facilities

A direct outcome of college expansion programs has been the development of master plans to control

Amounts of money expended for public school construction in the Central states followed the general trend of a rise over 1956 totals. Costs rose from 836 million dollars in 1956 to 896 million dollars in 1957.

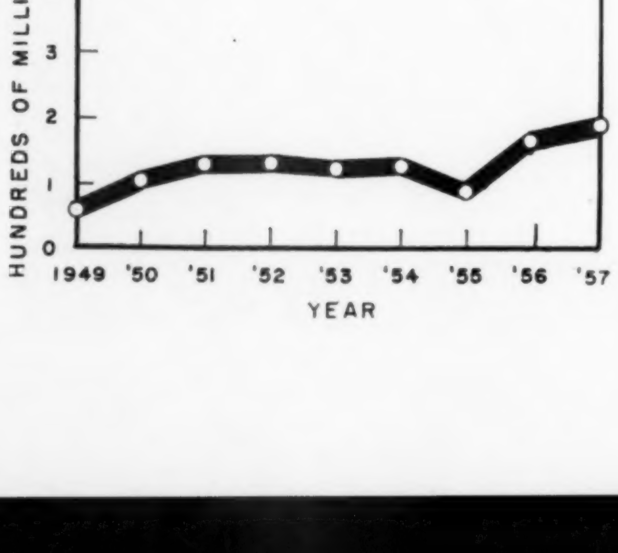


1957 saw completion of the Tomlinson Junior High School in Lawton, Oklahoma, Noftsger & Lawrence, architects. Shown above is the administrative suite.

growth on a particular campus. Examples of this method of planning are the Golden Gate Baptist Theological Seminary in San Francisco, California, and Central Christian College, Bartlesville, Oklahoma. Both of these colleges were planned in entirety as integrated units related to the development potential of the surrounding area.

College planning is also being integrated with urban redevelopment proposals. Some years ago Illinois Institute of Technology undertook a building program which improved the character and appearance of a large area of the city of Chicago. Today, Temple University in Philadelphia has linked its development with the overall plan for the city's growth and improvement. The tremendous undertaking at Philadelphia has demanded the close cooperation of university officials, architects, city planners and state officials. The city and the university will benefit immeasurably from this program.

Total costs for public school construction in the states of New England rose to 199 million dollars in 1957, as compared with 164 million dollars spent in 1956.

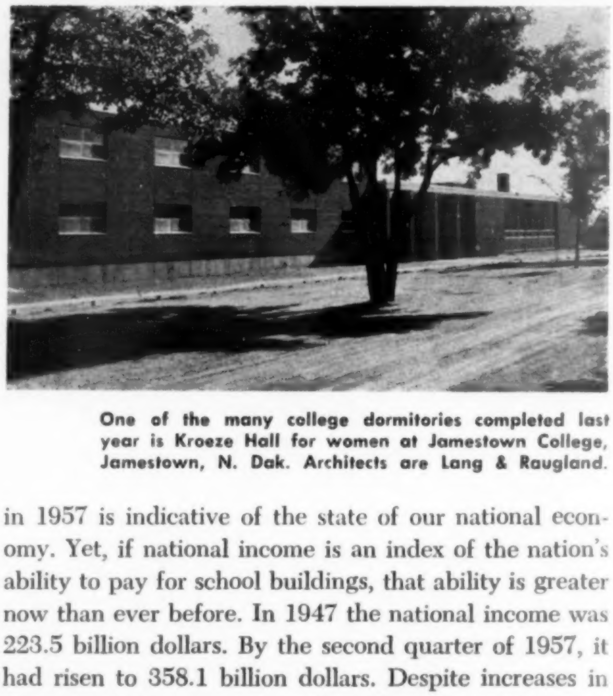


Outmoded Building Codes

Planning and cooperation by local school districts with state officials has often been difficult because of restrictions written into state building codes. Such regulations frequently place a strait-jacket on the architect and stifle the creative design, as well as the economical design, of school buildings. Outmoded codes point up the need for non-restrictive, up-to-date, minimum regulations. The state of Virginia recently repealed a number of restrictions and revised the state building code in keeping with this realization.

The National Economy

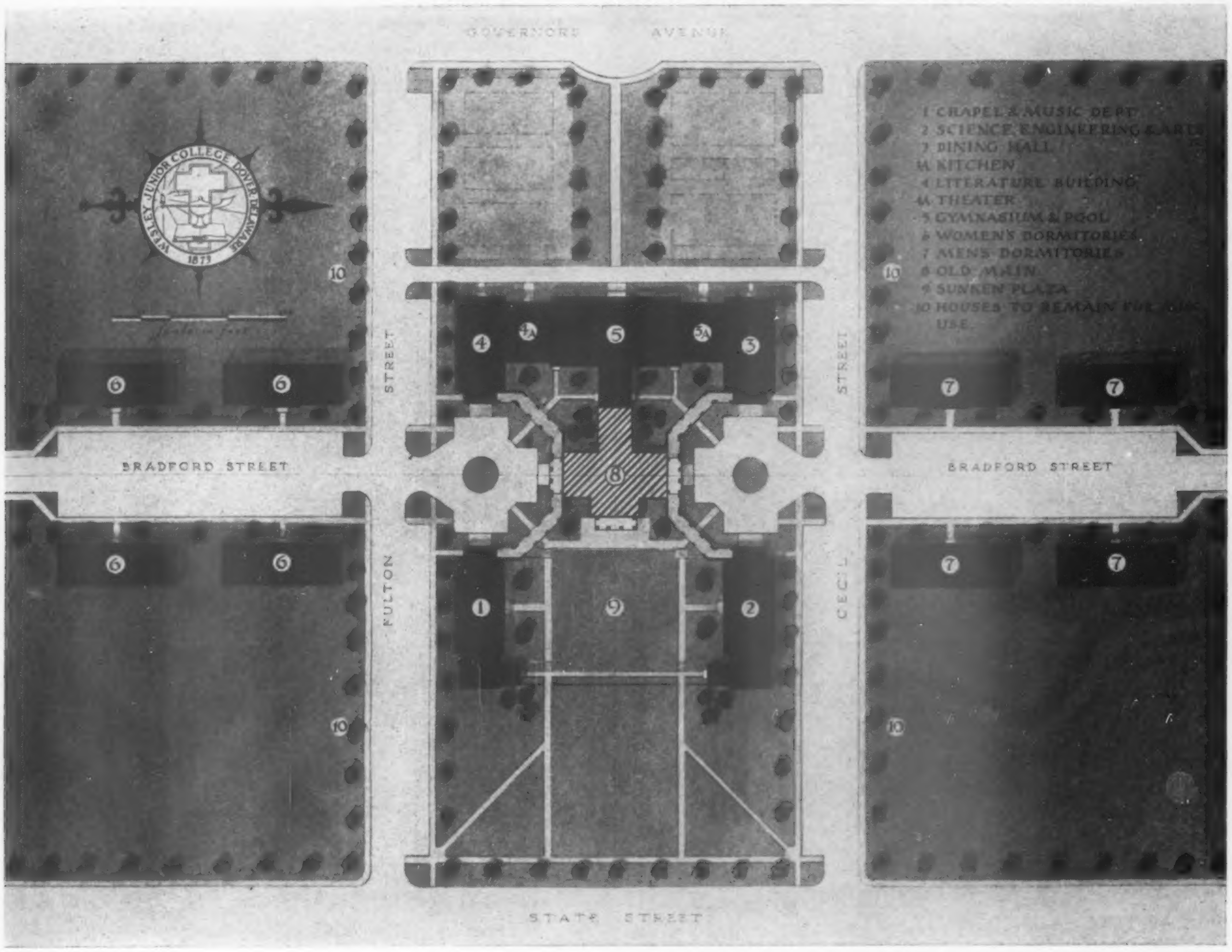
State and local events mirror the condition of the nation as a whole. The number of defeated bond issues



One of the many college dormitories completed last year is Kroeze Hall for women at Jamestown College, Jamestown, N. Dak. Architects are Lang & Raugland.

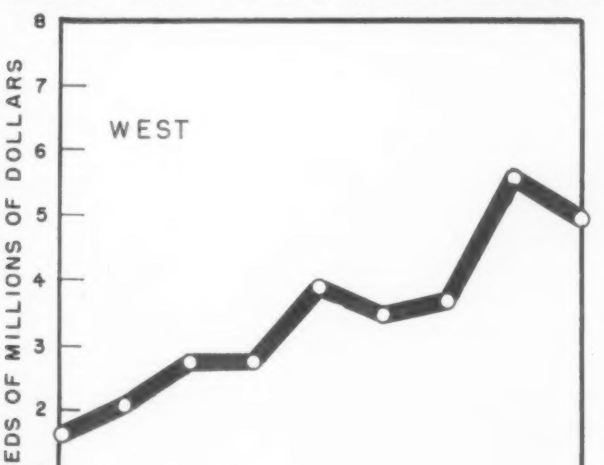
in 1957 is indicative of the state of our national economy. Yet, if national income is an index of the nation's ability to pay for school buildings, that ability is greater now than ever before. In 1947 the national income was 223.5 billion dollars. By the second quarter of 1957, it had risen to 358.1 billion dollars. Despite increases in the nation's income and productivity, there is the paradox of a business recession and increasing unemployment. The government is even now marshalling its resources to prevent a widespread depression.

Coupled with economic difficulties are a number of other issues that affect attitudes toward education. These, in turn, have a bearing on the construction of new educational buildings. The Russian "sputniks" and the American "explorer" have forced a re-evaluation of science and science education. Arguments once again raise the question of whether American education is to remain free and universal, or whether it is to assume an elitist character. The Little Rock "incident," while pushed out of the limelight by the satellite launchings, nevertheless remains as a grim reminder of the racial

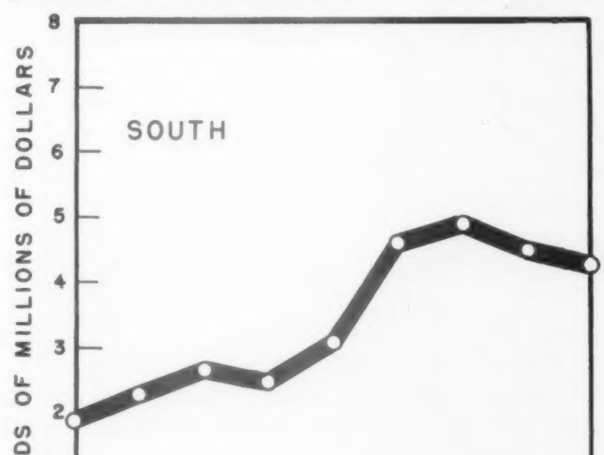


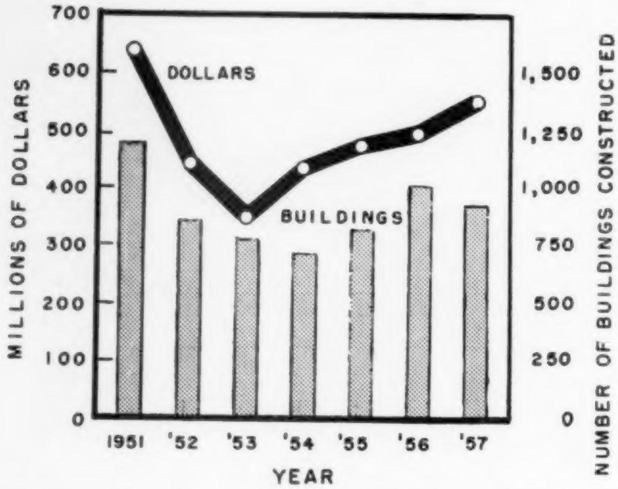
Campuses for new junior or community colleges are now being planned. Wesley Junior College, Dover, Delaware, has begun a long-range campus construction program which will be completed in 1965. Architects are Larson and Larson. The new buildings will be grouped about the old main building in the center.

In contrast to general trends in public school construction costs, total amounts expended in states of the West dropped to 496 million dollars in 1957 from a total of 575 million dollars in 1956.



Public school construction costs in the South also declined in 1957 to 423 million dollars from a total of 446 million dollars expended in 1956 for new structures.





Total expenditures for new college construction rose in 1957 while the number of new buildings showed a decline.

issue being faced by many communities south and north.

However, the future is far from bleak. Growing awareness by citizens of the real nature of controversial issues will undoubtedly result in practical compromises. Population growth will mean expanded productivity and increasing wealth. A reorganization of taxation methods is called for, with sources being tapped which have hitherto been neglected. More funds will thus be available for local, state and federal support of education.

Factors Influencing Design

The years since 1950 have seen an increased public awareness toward education. The attendant criticism has forced laymen and educators alike to re-examine the program of the schools. Citizens now participate in educational planning in many communities. Local districts have turned for assistance to educational consultants, architects and city planners in preparing school facility programs.

As a result, a greater proportion of school architecture reflects an emphasis on educational planning. Where such planning is carefully carried out, a school is designed for the nature and needs of the people who will use it. As human values in school architecture receive attention, stimulating design concepts emerge.

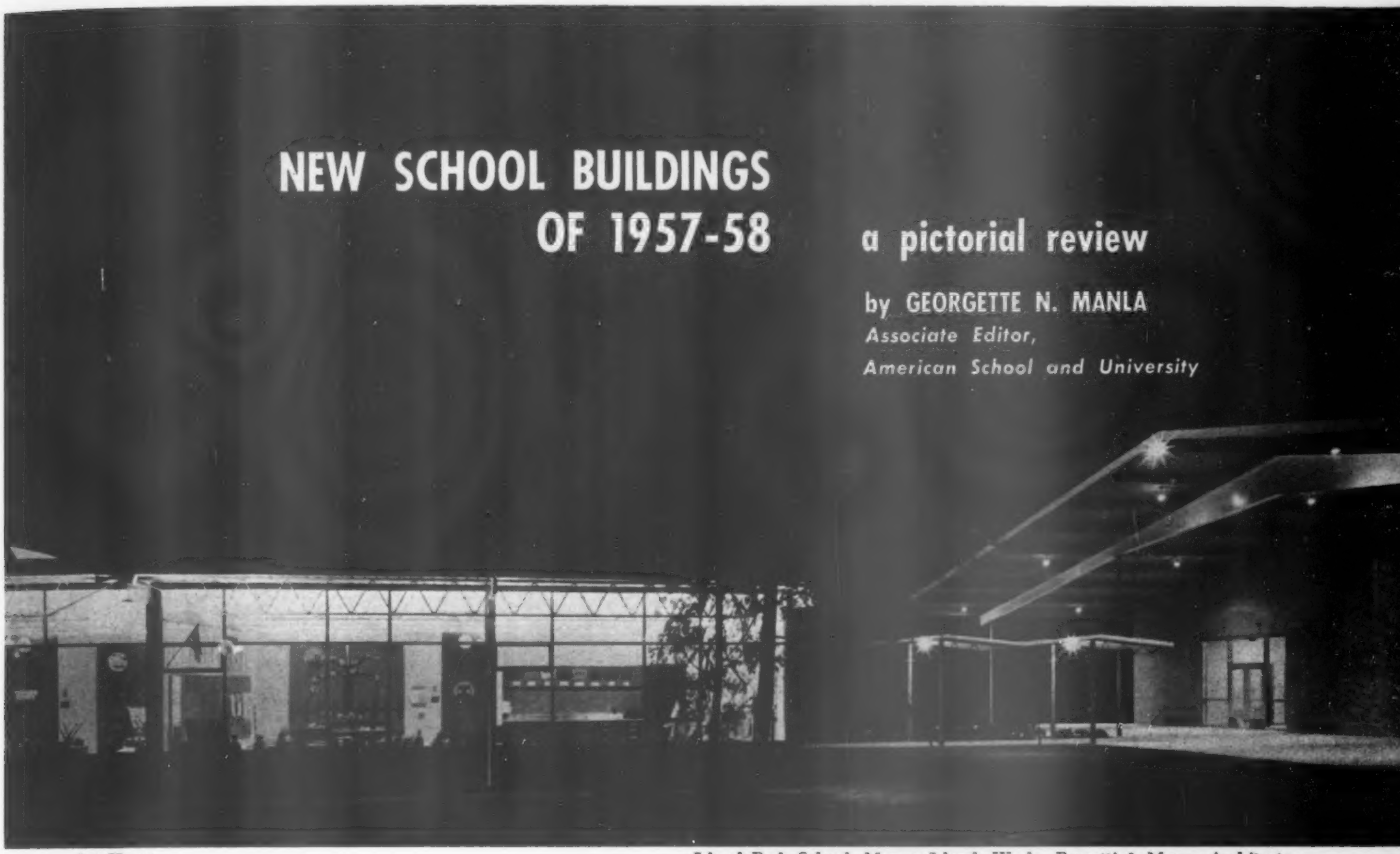
In 1957 some 3,000 architectural firms designed one or more new school buildings. The very volume of design involved means that mediocre as well as good and superior schools have been erected during the past year. To their credit, however, educators, architects and laymen are combining forces in the effort to produce worthwhile structures.

Looking Ahead to the Future

The current economic recession will probably have a significant influence on school construction trends in the months to come. Private giving and public support may diminish as the national psychology becomes more economy conscious. A slight decline in the cost of many building materials and lowered rates on bond issues offer encouragement for the future, despite the rises in prices and in cost of labor.

The need for new buildings will still be acute even though it is general agreement that the volume of school construction will rise during 1958. Funds for new buildings are but a part of tremendous expenditures needed for education. As expressed in the recent report of the Educational Policies Commission, "The real need is for an infusion of public and private support on a massive scale."

Perhaps the most emphatic hope for the improvement of educational plant and program resides in the development of active participation by citizens. In the short and long run, the strengthening of American education will depend on how well it has achieved public understanding and support.



Art Hupy

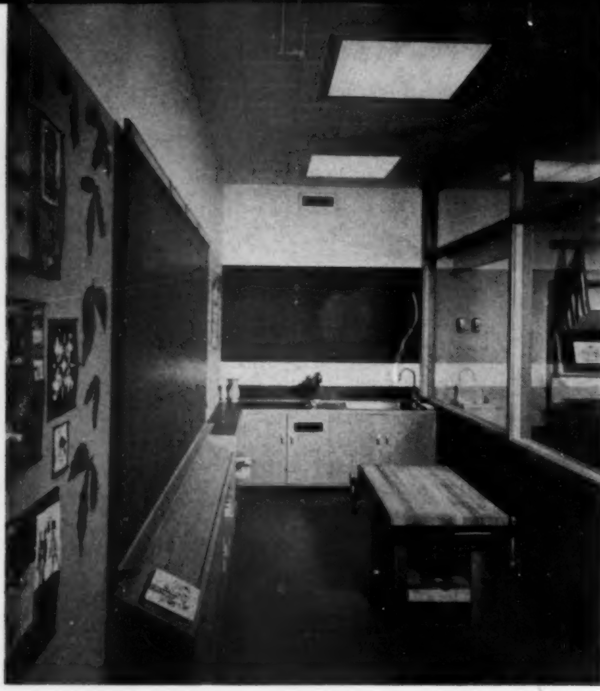
Island Park School, Mercer Island, Wash., Bassetti & Morse, Architects

THE past year saw hundreds of new building projects for school districts and colleges and universities in every stage of development—preliminary planning sessions, design schemes, ground breaking ceremonies, actual construction, completion and dedication. Buildings completed during the year represent the culmination of effort and skill by many persons to provide schools which best suit the needs and purposes for which they were financed and built. We can learn much from these structures.

A look at some of the new school and college buildings of the past year is presented here for those involved or interested in school plants. Architects of 19 educational buildings of 1957–58 have cooperated in this pictorial review, which includes six elementary schools, six secondary school plants and seven college buildings.

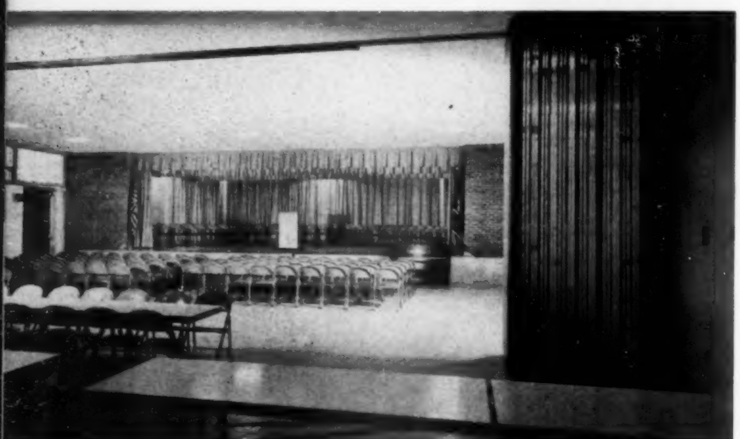
These buildings are located in 13 states of the nation, from Maine to Texas and from Maryland to Washington. The elementary schools range in cost from \$172,850 to \$993,753; the secondary schools cost from \$966,253 to \$2,507,180; college structures range from a science hall for \$400,000 to a dormitory-cafeteria group which cost \$1,183,535.

While being only a small fraction of the total number of school and college plants constructed during 1957–58, these 19 buildings are samples of our most recent educational architecture. Their design features, structural and finish materials, site orientation—indeed all the elements which together compose school and college plants —indicate present, and possibly future, trends in school and college buildings.



Workroom

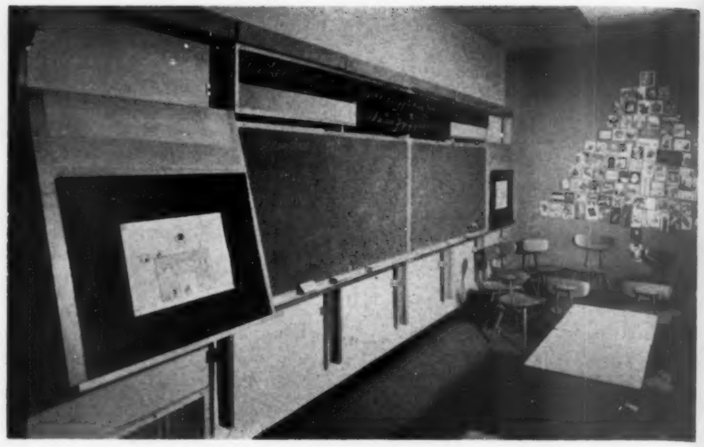
All-purpose room



Court

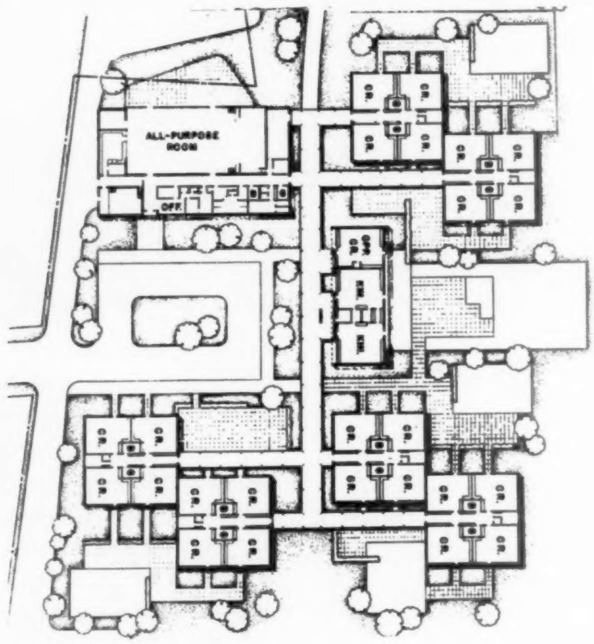
Joseph W. Molitor Photos

Clover Street Elementary School
Windsor, Connecticut
WARREN H. ASHLEY, Architect
West Hartford, Connecticut



Classroom

Floor plan

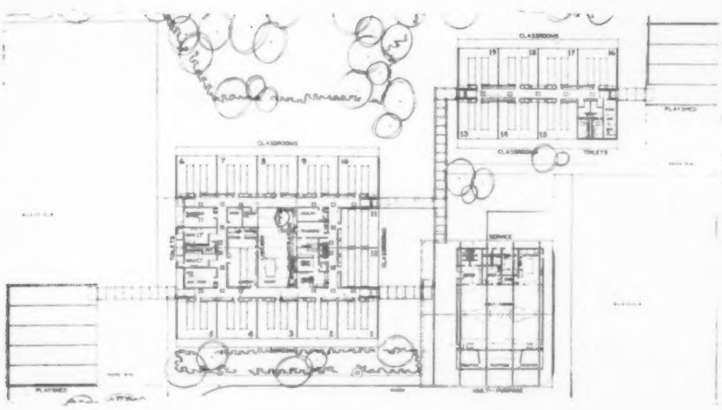


The Public Building Commission of the Town of Windsor, Connecticut, recognized the economic and educational advantages of a unit type of construction for the new Clover Street Elementary School. Five acres of plateau land on the 15 acre site were the best location for the building and a compact cluster type plan was developed by architect Warren H. Ashley. The all-purpose room serves as an assembly, indoor play area and cafeteria. Each room has direct exit to the out of doors. Poured concrete foundations, brick exterior walls with cinder block backup, aluminum sash with glass and insulated enamel steel spandrel are the structural components. Interior partitions are metal studs with wirelath and plaster finish, with sprayed on cement enamel in corridors, toilets and kitchens. Classroom walls are finished in cork from floor to ceiling. The roof deck is poured concrete slab and beam construction. Troffers between beams serve as light recesses. Every other troffer has a single continuous fluorescent tube and is covered by flexible corrugated plastic to make all lighting flush with the ceiling. Costs amounted to $993,753.

Art Hupy Photos

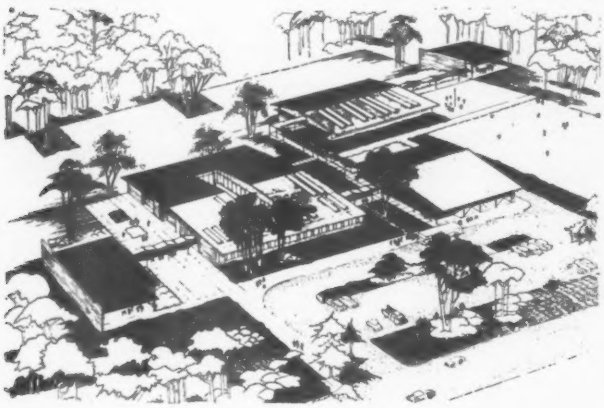
Exterior at night

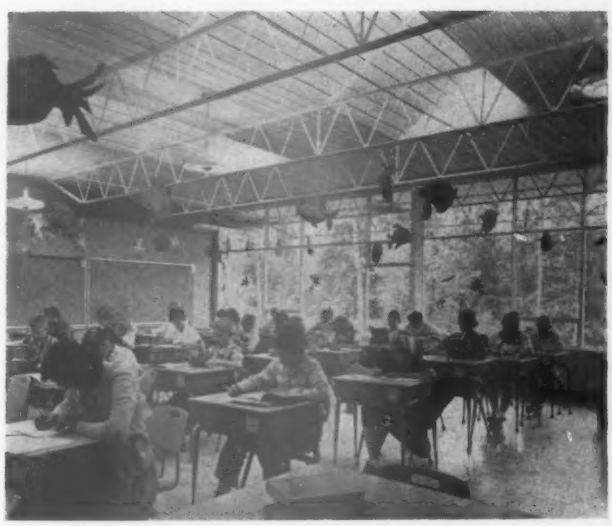
Floor plan



Multi-purpose room

Perspective

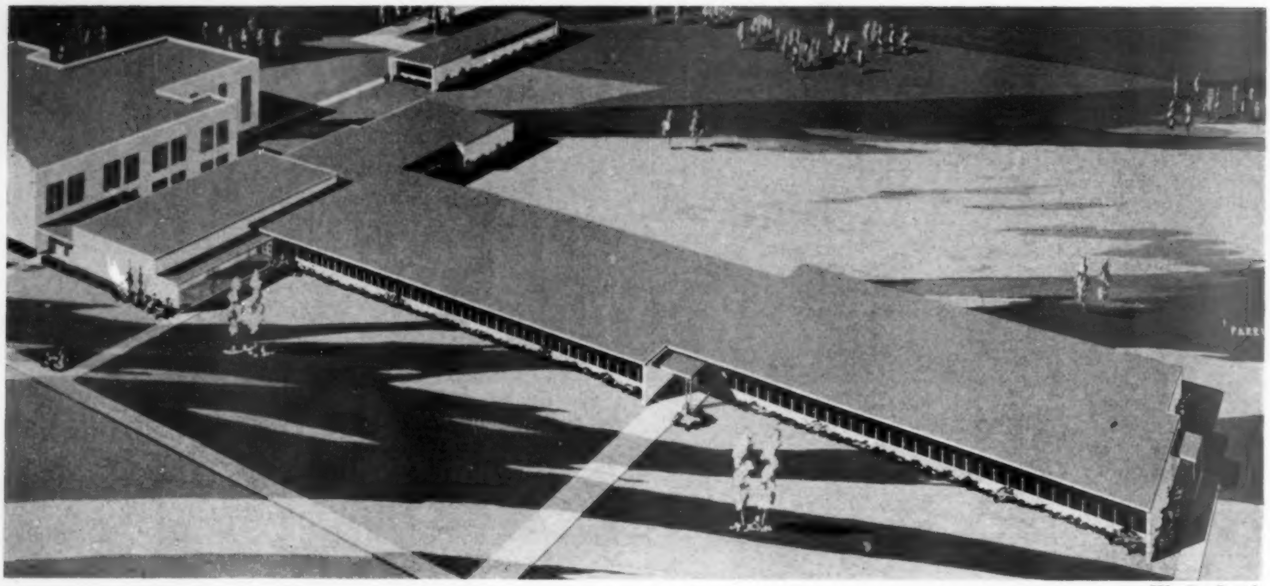




Typical classroom

A cheerful and simple elementary school has been designed by architects Bassetti & Morse for the flat country site in Mercer Island, Washington. Strip plastic skylights, facing north, daylight all class areas. Units center about a sheltered interior court. The ten acre site adjoins a 40 acre county park. Walls are pumice block for both exterior and interior. Foundations are concrete with a floor slab on grade. The steel roof deck has rigid board roof insulation, with a wood deck on the multi-purpose building. There are stainless steel counters and sinks in the classrooms and kitchen. Construction costs totaled $362,581.16. Large glass areas and low window sills add to the spaciousness of the areas. Lighting throughout is incandescent. All rooms are heated and ventilated by forced air.

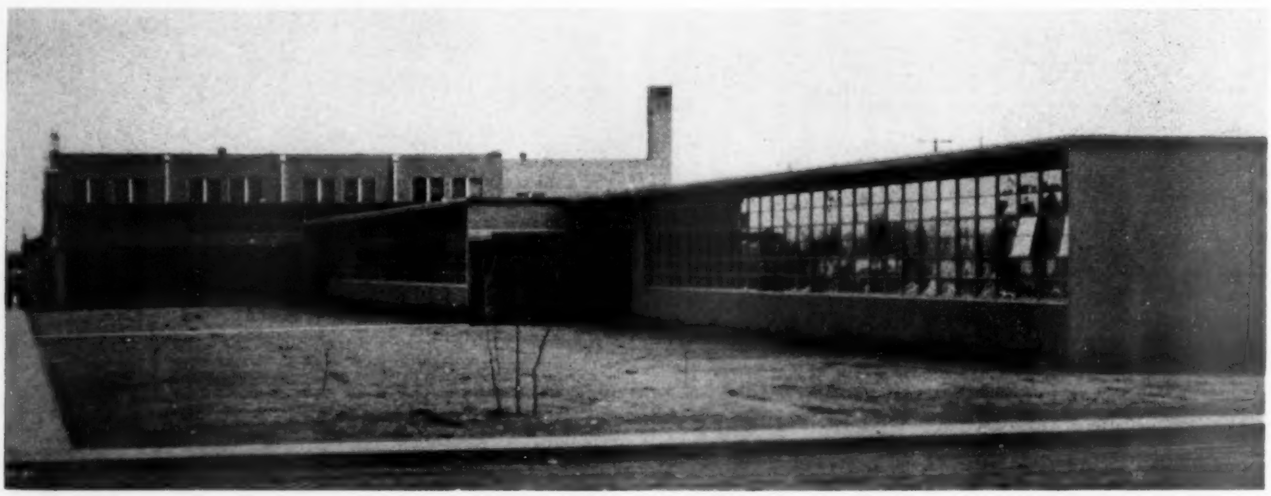
Island Park School
King County, Mercer Island, Wash.
BASSETTI & MORSE, Architects
Seattle, Washington

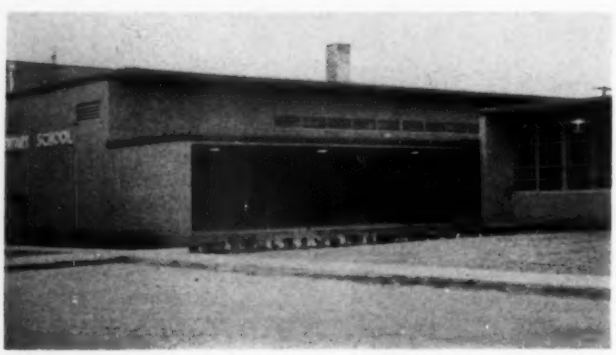


Model of school

W. D. Smith

Exterior

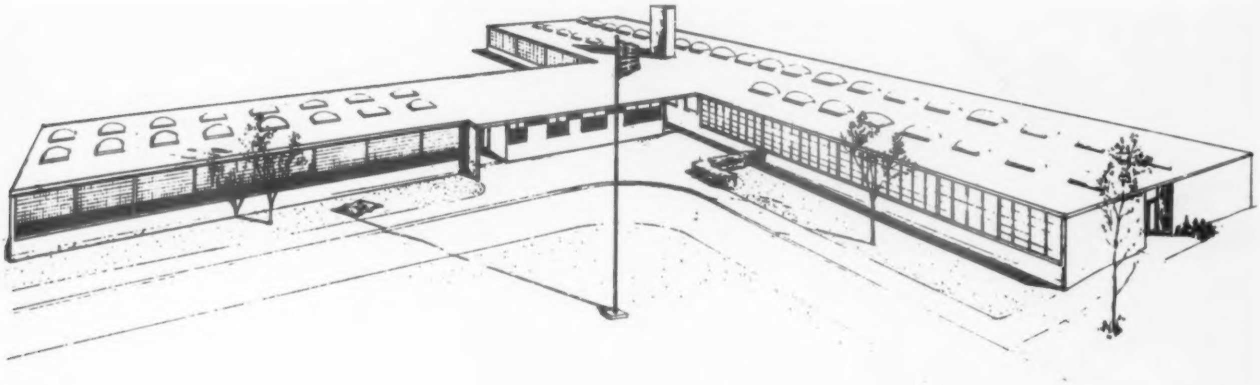




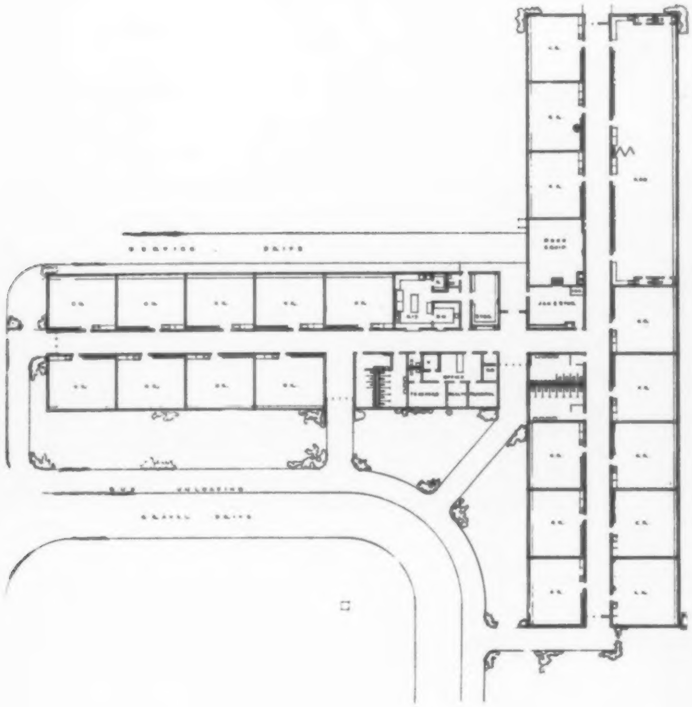
Entrance

Sudan Elementary School
Sudan, Texas
HEDRICK & STANLEY, Architects
Fort Worth, Texas

The $385,000 Sudan Elementary School contains approximately 30,925 square feet of area. The school includes 16 classrooms, a band and chorus room, administrative offices, cafetorium, kitchen, book room and ample storage space. The exterior is face brick, marked by long lines of steel projected windows and asbestos panel boards. The gravel roof is accented by redwood fascia. All walls are of light-weight concrete blocks, and most floors are asphalt tile, with ceramic tile used in the toilet areas. The kitchen, shop, serving area, mechanical room and storage rooms have concrete floors. This building, designed by Hedrick & Stanley, architects and engineers, was planned to function with an existing high school, which is adjacent.



View of exterior



Floor plan

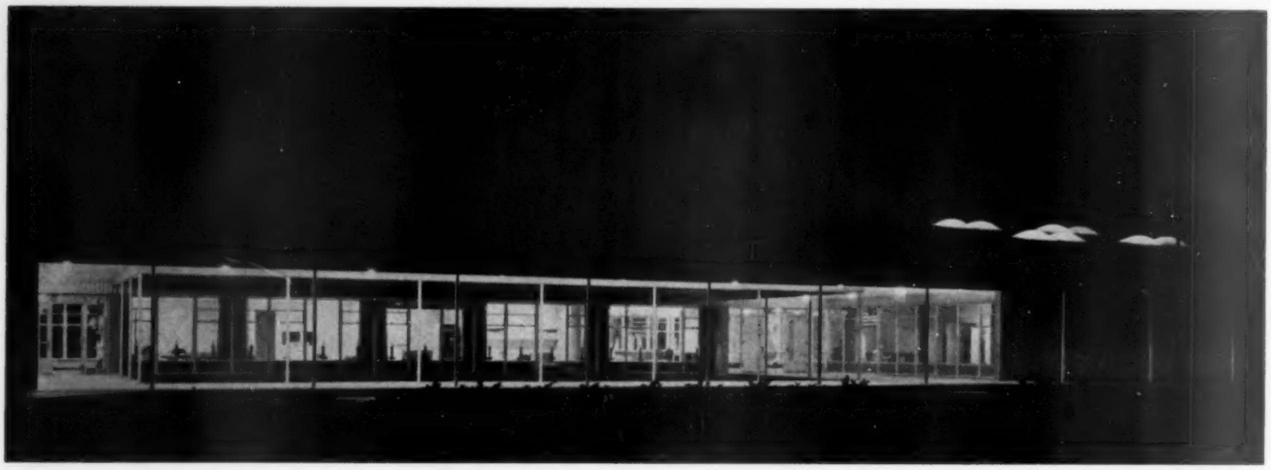
Double kindergarten

Wooliever Studio

Exterior

The rural site of Pine Knob Elementary School was a low area adjacent to a swamp. Area occupied by the building had an exceedingly high water table and required large draining tile and ditching off the immediate site. Footings, therefore, are larger than is normal for this type of building. Large amounts of earth fill were also required. The school, designed by Leo J. Heenan, AIA, cost a total of $454,214.12, and is basically a steel frame, steel deck structure on reinforced concrete spread footings, with a skin of brick walls and glass. Interior partitions are cinder block with glazed block used in areas subject to wear. Kitchen and toilet floors are quarry tile and all others are vinyl asbestos on concrete. Lighting is incandescent. Classrooms have skylights and are heated and ventilated through unit ventilators. Two classrooms are special education rooms paid for by Oakland County and used for handicapped children. There is a complete kitchen with walk-in refrigerator, dishwashing room, storage and service facilities.

Pine Knob Elementary School
Clarkston, Michigan
LEO J. HEENAN, A.I.A.
Pontiac, Michigan

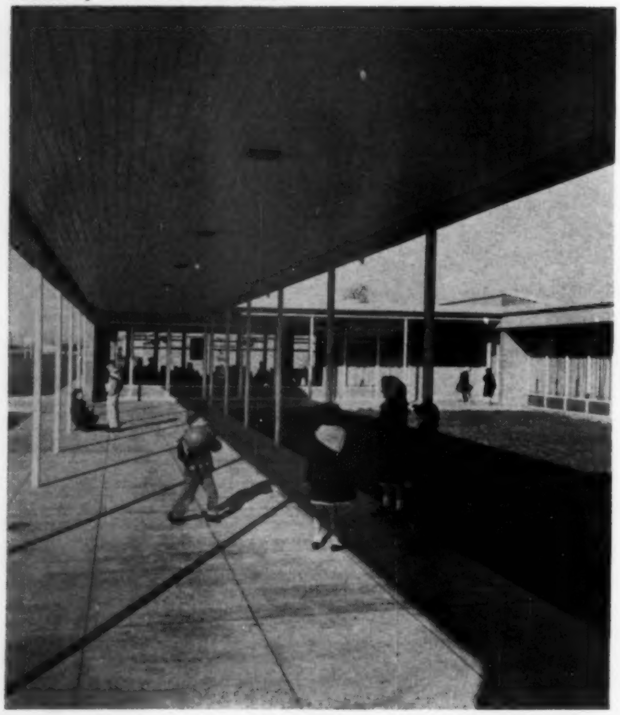


Exterior by night

Wide corridors

Clerestory classroom windows

Photos by Kranzten Studio Inc.



Canopied walks

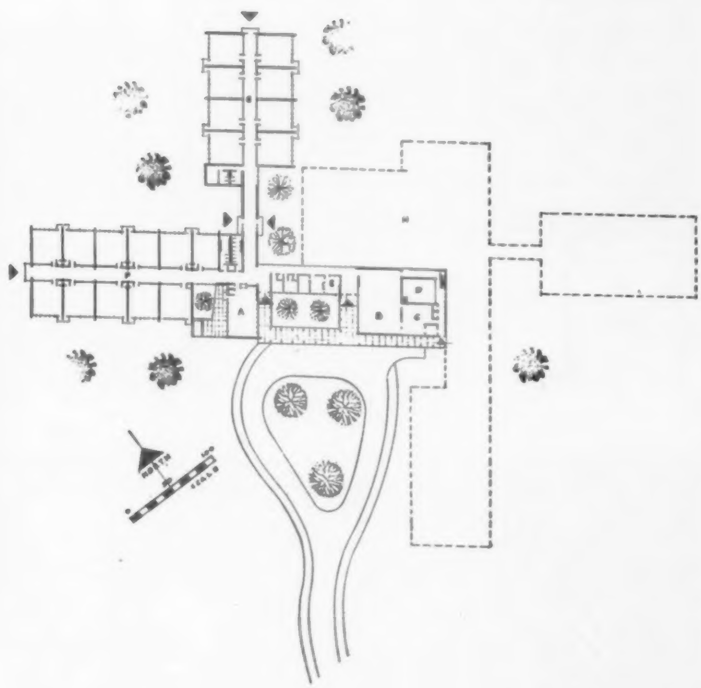
Bon Air Elementary School, designed by Perkins & Will, Architects and Engineers, typifies the basic elements of what the rapidly expanding industrial community of Kokomo, Ind., expects from its school buildings. The plan for Bon Air was three-fold—the school was to serve as a community center; it was to be low in cost while retaining economical soundness achieved through durability and attractiveness; and the school was to be expandable to accommodate a junior high school wing later. Located on a level site of 20 acres, the school has 20 classrooms; a wing for the multi-purpose room, kitchen and boiler room; and a central court. The administration center leads from the central court. All facilities are designed for future adaptability as well as present suitability. Skydomes feed light into the multi-purpose room, and may be covered as needed.

Bon Air Elementary School
Kokomo, Indiana
PERKINS & WILL, Architects
Chicago, Illinois

Work counters

Serving counter

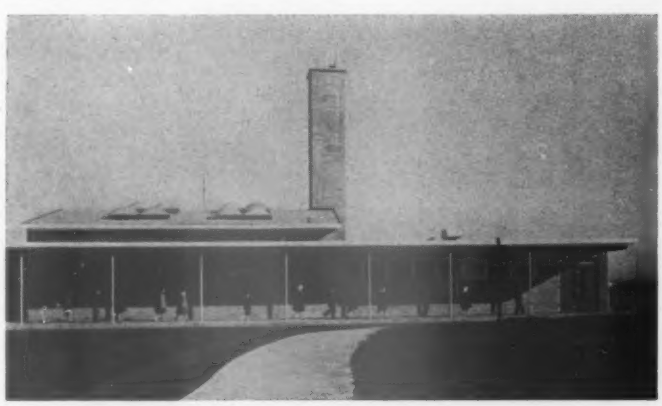
First grade room

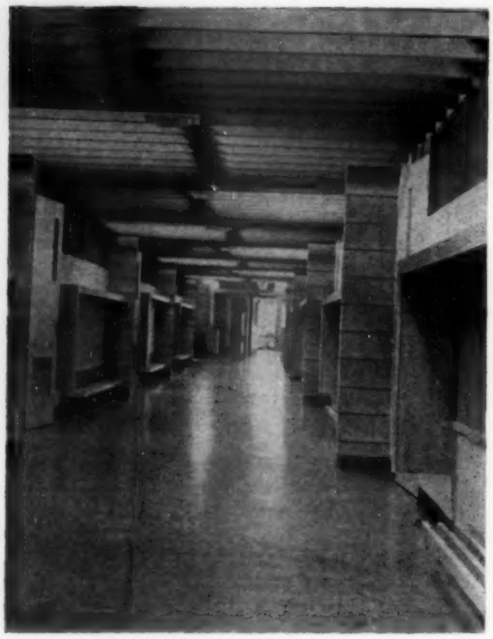


Floor plan

Costs for the Bon Air Elementary School amounted to $590,286. Exterior brick of the structure is repeated indoors to achieve a unity of interior and exterior. The building is bright and gay with unabashed use of vivid colors. Wood painted fascias are red while doors are blue. Porcelain enameled insulated spandrel panels under the wide window areas are orange. All classrooms have work counters, sinks and chalkboard lighting. Shelves, boot ledges and adjustable coat hooks of the corridors are scaled to the children. Corridor coat racks were prefabricated and slipped into place. The school accommodates 600 students, but the multi-purpose room has been designed for 1200.

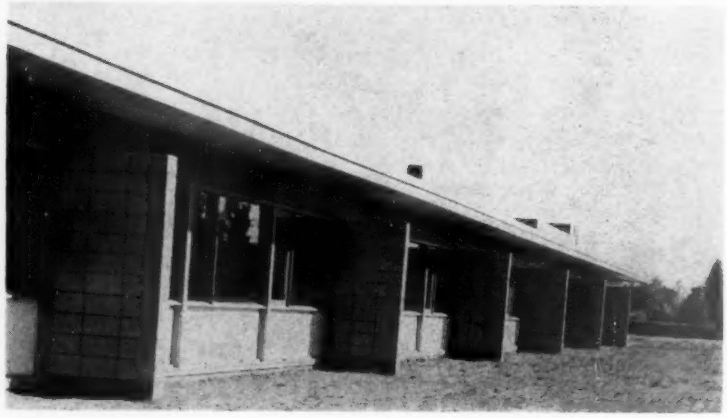
Exterior view

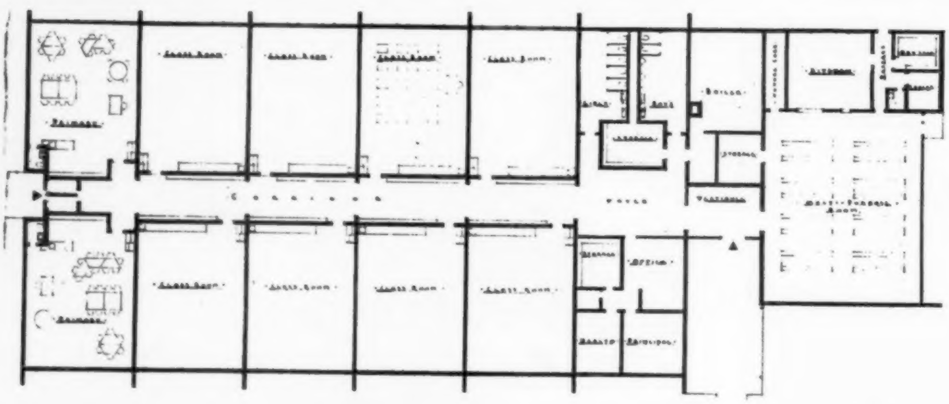




Sky-lighted corridor

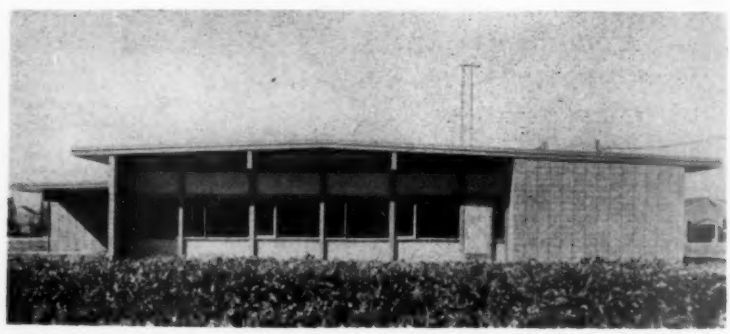
Colored block walls

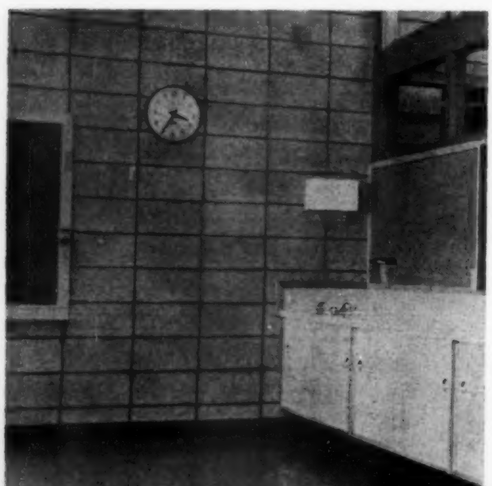




Floor plan

Exterior view

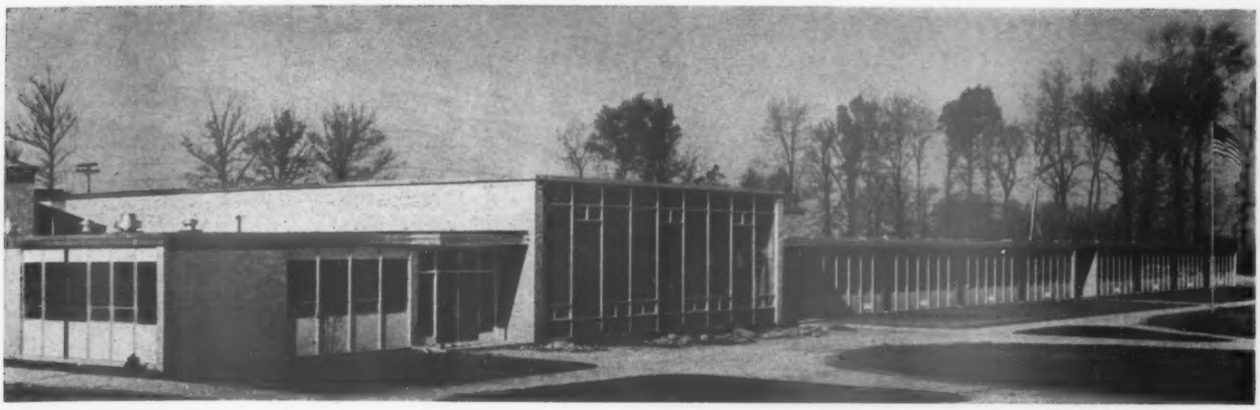




Classroom corner

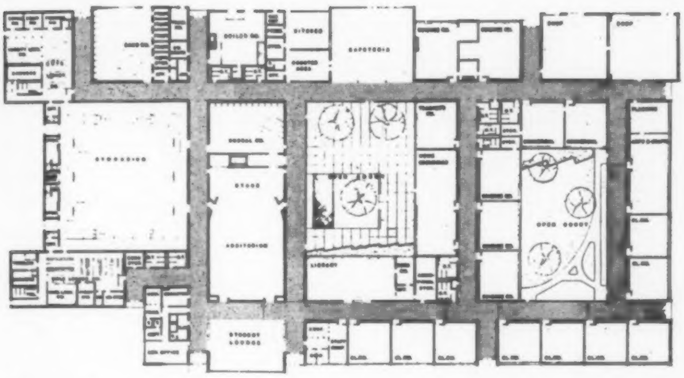
Fairfield Elementary School
Fairfield, Montana
PAGE & WERNER, Architects
Great Falls, Montana

Fairfield Elementary School was designed by architects Page & Werner to fill the immediate needs for ten additional classrooms for Fairfield, Montana, and provisions for serving a hot lunch program. The structural system has five bays of glue laminated beams, running longitudinally through the building and placed on pipe columns with the masonry wall separating classrooms. The corridor has a dropped ceiling with skylights above. The deep classroom design permits a work area near the corridor in each room and encourages a close association between student and teacher. The school was constructed at a cost of $172,850.



East elevation

Typical classroom



Floor plan

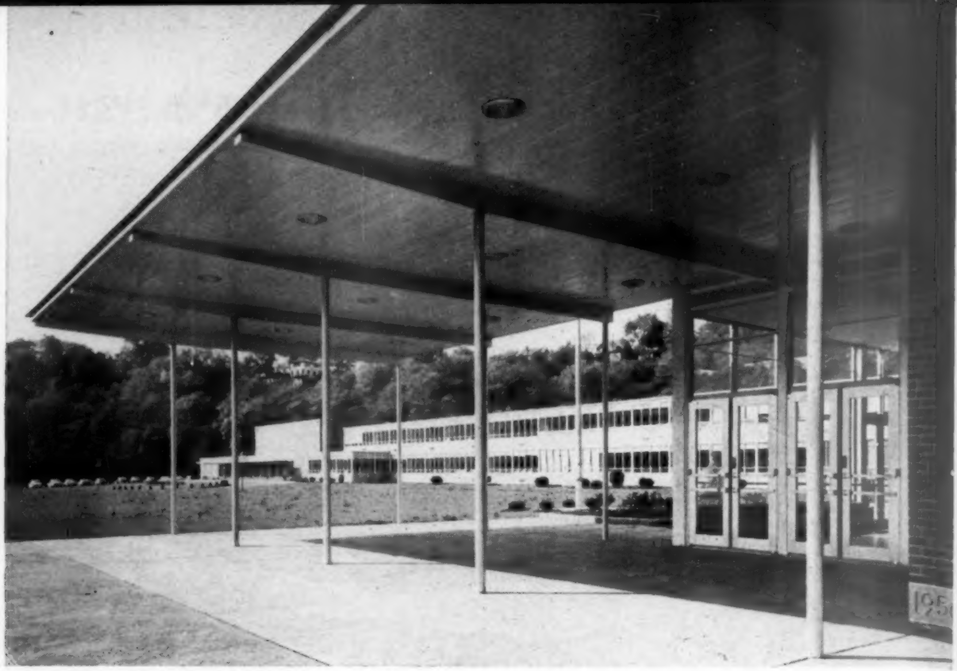
Exterior rendering

Lens-Art Photos

Lamphere High School is the first secondary school unit for a rapidly growing "bedroom" community in the Greater Detroit Metropolitan Area. As the school population increases, a senior high school will be built on another site and this school will become a junior high school. Designed by H. E. Beyster & Associates, Inc., the school houses 700 students. Classrooms are toplighted with plastic domes supplemented by rapid-start fluorescent lighting. There is a complete commercial and UHF educational TV system. Structure is steel frame with cellular steel deck and suspended metal pan acoustical tile. Exterior trim is face brick. Total cost amounted to $1,542,296. An outstanding feature is the auditorium or little theater seating 350. It has been carefully planned as a fundamental part of the educational program and as a cultural activity area for the community.

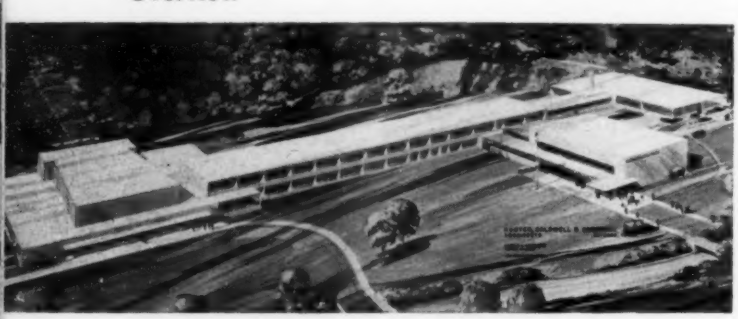
Lamphere High School
Madison Heights, Michigan
H. E. BEYSTER & ASSOCIATES, INC.
Detroit, Michigan

Canopied entranceway

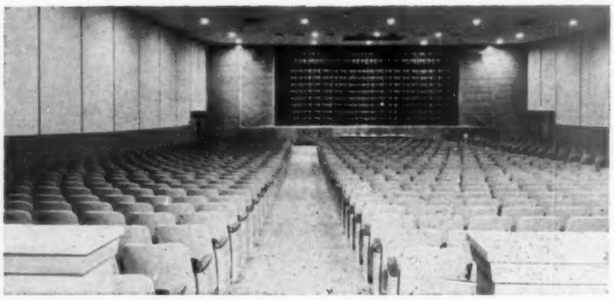


First and second floor plans

Overview



Auditorium



Art room

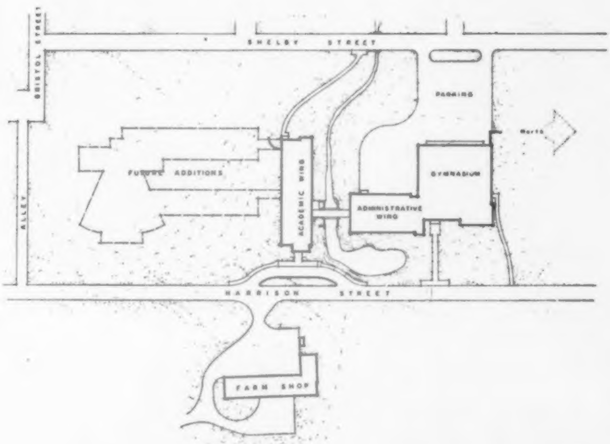
Claar Studio

New Kensington High School
New Kensington, Pennsylvania
HUNTER, CAMPBELL & REA, Architects
Altoona, Pennsylvania

New Kensington High School has been room-scheduled to accommodate a comprehensive program of high school services. The 23 acre site is accessible to the great majority of students walking to school. Instructional areas are grouped by common relatedness and advantageous access. Construction consists of piling subfoundation, concrete footers, block foundations, concrete floor bases, crawl space beneath the structure, steel frame, aluminum curtain wall and insulated porcelainized aluminum panels. Exterior is brick at the auditorium and gymnasium. The building has adequate natural lighting, supplemented by incandescent and fluorescent systems. A small stream on the site was rerouted for site utilization. Costs amounted to $2,507,180.

Bridge over creek

Shop room



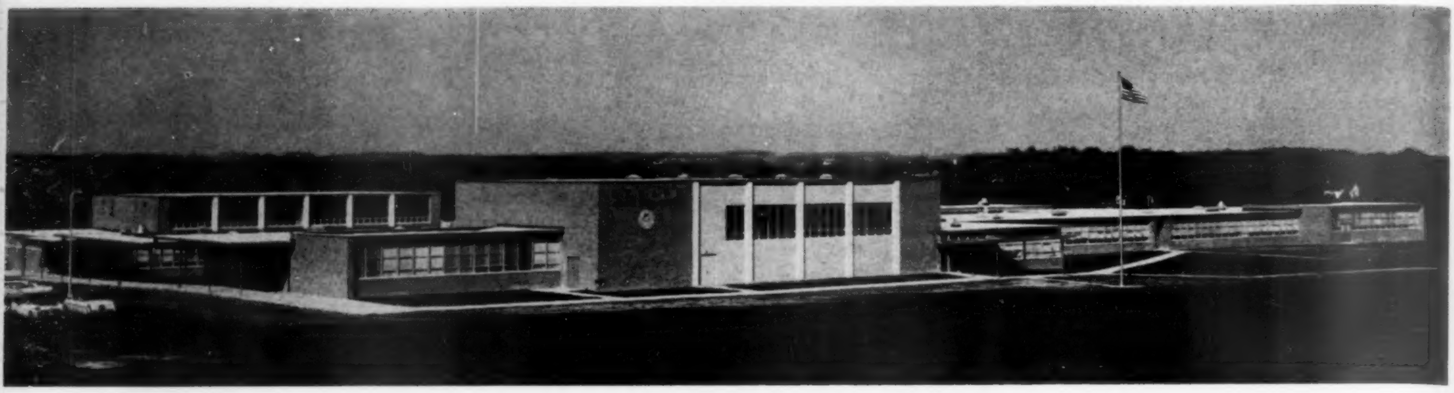
Site plan

High school

Shop building

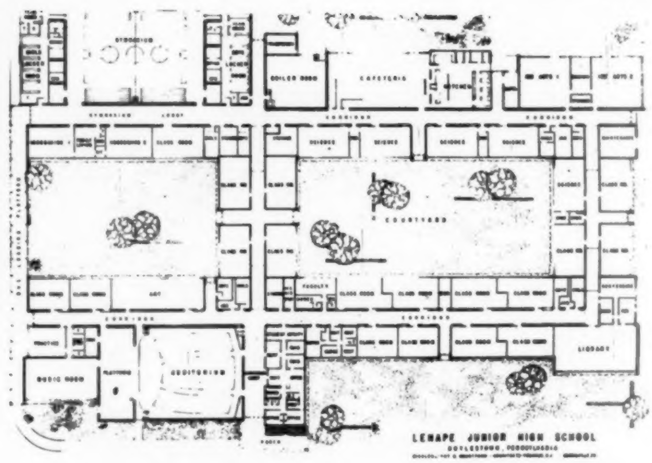
A creek with a flowing spring divides the difficult site of the new Salem-Washington Township High School. A bridge connects wings of the school. A separate farm shop unit is also located on the site. The high school is basically steel frame, with bar joists and concrete floors, brick exterior and large areas of window wall and porcelain enamel insulated panels. The academic building contains 16 classrooms. The shop building includes a heavy metal and forge shop, farm, wood, electric and mechanic shop areas. There are a total of 34 teaching and administrative areas within the high school, constructed at a cost of $966,253. The gym is spanned by steel rigid frames 140 feet long, and the area comfortably seats 3,500 persons.

Salem-Washington Township High School
Salem, Indiana
EDWARD D. JAMES & ASSOCIATES, INC.
Indianapolis, Indiana



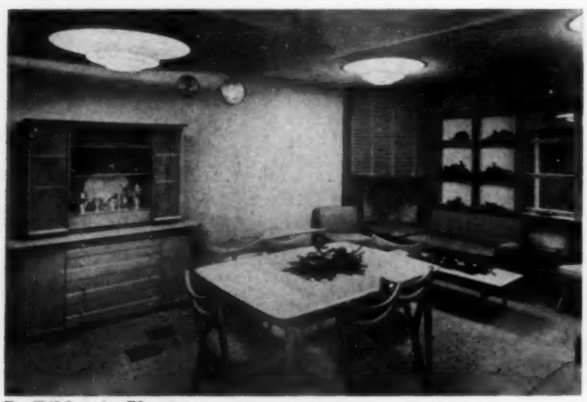
Exterior

Floor plan

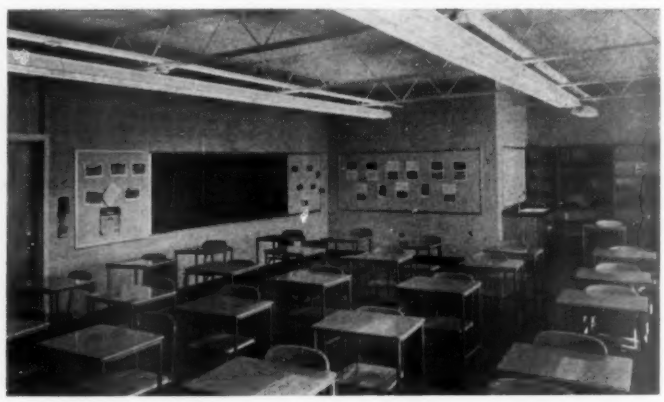


Corridor with ramps

Family living room



Core classroom



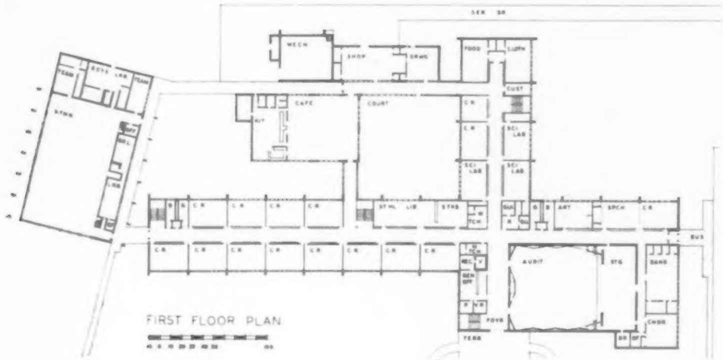
R. DiMaggio Photos

Lenape Junior High School
Doylestown, Pennsylvania
MICKLEWRIGHT AND MOUNTFORD
Trenton, New Jersey

The design problem for Lenape Junior High School was to provide facilities for 800 plus students using a core type program. The ample site had a severe downward slope. Structural elements are exposed throughout the building. Framing is steel with a gypsum roof deck on insulating formboard. Floors are generally concrete slabs on gravel. Some load-bearing interior walls were used. The exterior is red brick with terra cotta panels for the auditorium. Windows are aluminum projected type; floors are terrazzo, ceramic, quarry and asphalt tile to suit the areas; wainscots are ceramic tile, wood, brick, glazed concrete block; walls are exposed Waylite block, painted. Ceilings are mineral fissured tile in corridors, exposed fiberglas formboard in remainder of the building. Costs, exclusive of site purchase, totaled $1,572,694.

Exterior view

Cafeteria



First floor plan

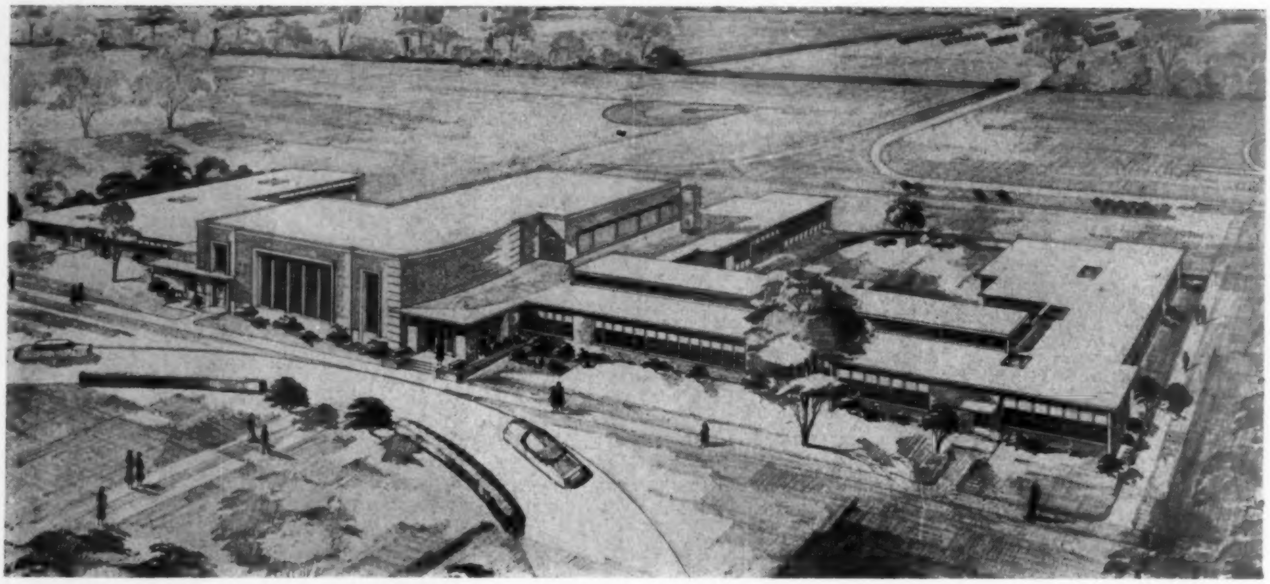
Classroom

Exterior view

Richard Neptune

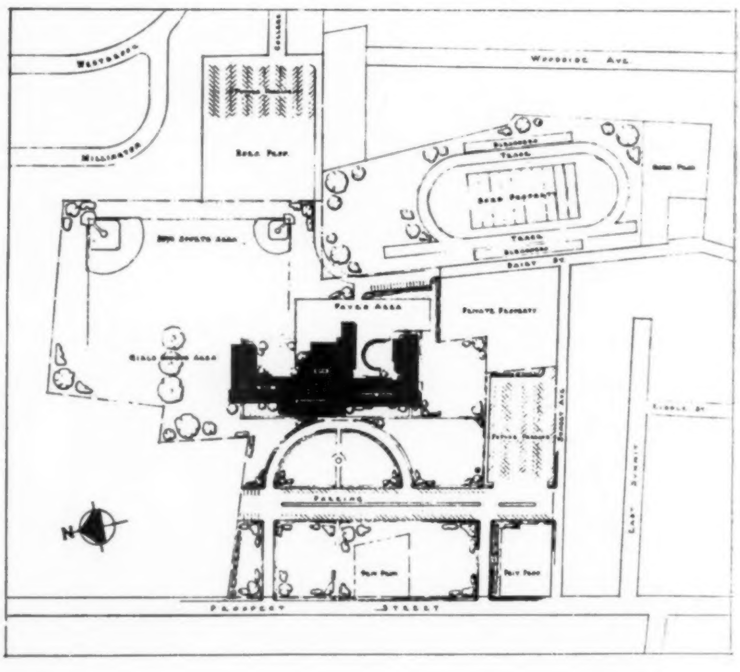
The new $2,500,000 Tomlinson Junior High School is located on a 17 acre site. It is a two story completely fireproof structure, of brick and masonry, with accommodations for 35 classrooms and 30 other instructional and administrative areas. The school is only part of a long-range building program and was planned in detail by Superintendent of Schools John Shoemaker, A. Richardson, principal, the school board and the architects. An outstanding construction job was done by the Charles T. Hughes Construction Company. Color and light are emphasized throughout the building. Windows make up at least one wall of each classroom and extend from floor to ceiling at stair landings. The gymnasium is fronted with mannered wire glass. Concrete baffles are used to reduce glare on windows of the structure. Exterior walls are face brick with blue porcelain window walls. Interior walls are plastered on clay tile. Corridors and toilets have colored structural glazed tile walls.

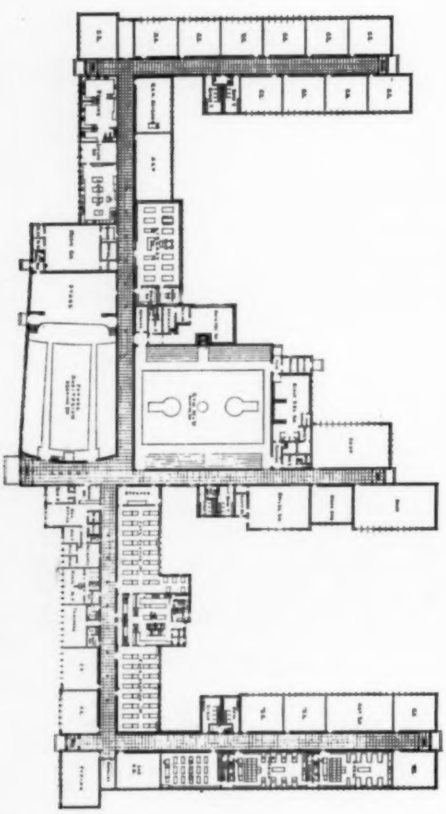
Tomlinson Junior High School
Lawton, Oklahoma
NOFTSGER & LAWRENCE, Architects
Oklahoma City, Oklahoma



Exterior rendering

Site plan





Floor plan

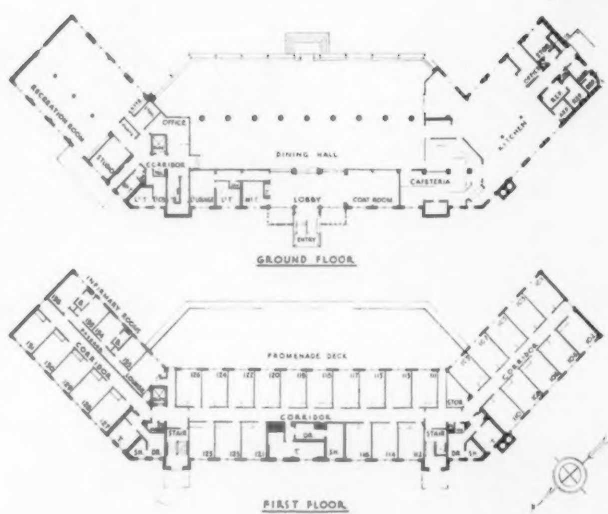
Midland Park Junior-Senior High School
Midland Park, New Jersey
JOHN F. & JOHN A. OSBORNE, Architects
Rutherford, New Jersey

Three years of study by the Board of Education of Midland Park, New Jersey, the school staff and Dr. Felix McCormick of Teachers College, Columbia University, went into the educational planning of the new junior-senior high school for the community. The building was designed for a high degree of flexibility and to permit easy and economical expansion when required. The 24 acre site adjoins a 10 acre town recreation field. School construction, site development, fees and other costs totaled $1,400,000. This is the first senior high school plant for the community which previously had used facilities at Pompton Lakes, New Jersey. Under the direction of Dr. C. H. Taylor, superintendent of schools, the new building provides maximum accommodation for school instruction purposes, with facilities also for select community activities.


Dave Drake

Exterior

Floor plans




Bedroom

The new Men's Dormitory and Dining Hall for Wagner College, Staten Island, New York, is a building of modern design. Located on a steeply sloping site, the structure has dormitory facilities for 200 men and a separately controlled, all-campus dining accommodation for 1,000 co-ed students (in two sittings). Windows of the dining hall command a superb view of lower New York Bay and The Narrows. The building is of reinforced concrete fireproof construction, with brick-faced concrete block exterior walls, Waylite block furring, and a built-up roof, gravel surfaced. Windows are aluminum, double-hung. Ceilings are exposed concrete slabs, painted, except for a suspended acoustical tile ceiling in the dining hall and cafeteria. Floors are asphalt tile, with vitreous tile in the toilets and a concrete floor in the kitchen area. Wooden, double wardrobe units are provided in the bedrooms and all furnishings are new and modern. Costs amounted to $1,105,500, including mechanical work, kitchen equipment, finished grading, walks and drives, but excluding fees and furnishings.


Dining room

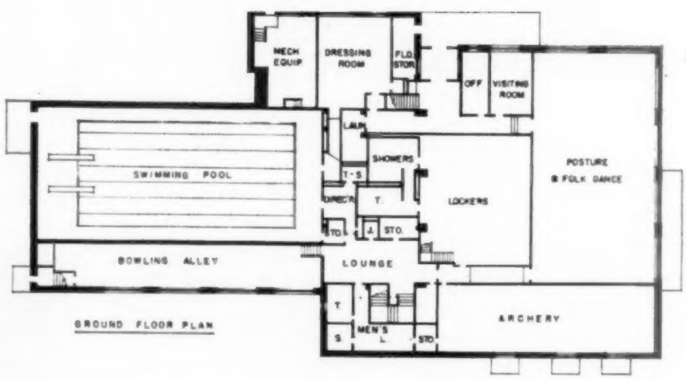
Men's Dormitory & Dining Hall
Wagner College
BESSELL & MATZ, Architects
New York, New York

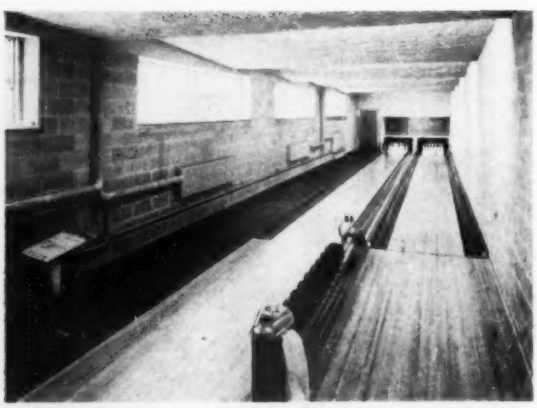
Building exterior

Don Morgan Photos

Main lobby

Ground floor plan



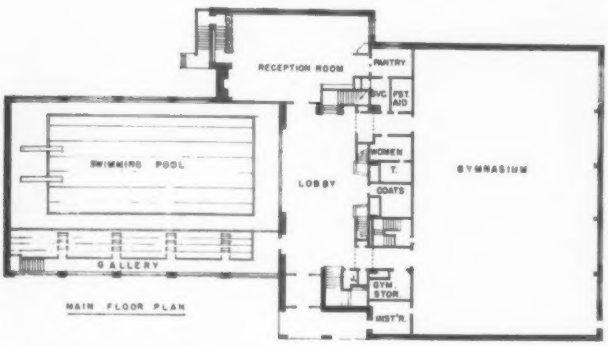


Bowling alleys

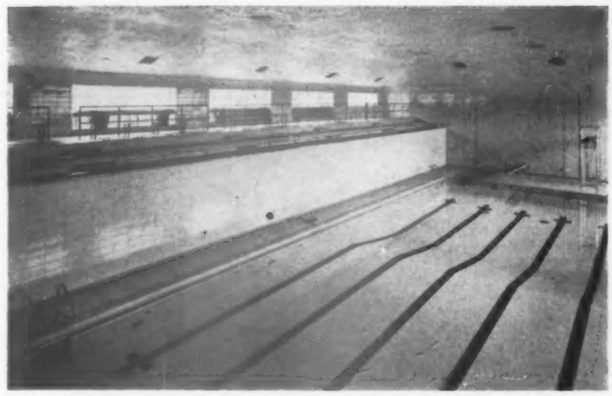
Physical Education Building
Manhattanville College of the Sacred Heart
EGGERS AND HIGGINS, Architects
New York, New York

Manhattanville College of the Sacred Heart moved to its Purchase, New York campus in 1952. The new Physical Education building, constructed at $1,160,000, is the first structure in its second phase of growth at the Purchase location. One wing is devoted to the regulation swimming pool and a gallery for 180 spectators. The gymnasium, in another wing, measures 63′ x 103′ and has a regulation basketball court. This wing also contains a large posture and folk dance room and an archery room. The new building has a spacious reception room. A feature of the main lobby is a 27-foot long glass wall which overlooks the swimming pool. Curtains may be drawn when privacy is desired for the pool area.

Gymnasium



Main floor plan



Swimming pool

Reception lounge

Laminated wood trusses span the maple-floored gymnasium, which is large enough to permit two practice games to be carried on simultaneously. The building's exterior harmonizes with existing structures of the college, also designed by architects Eggers and Higgins. A band of rusticated brickwork extends between the windows. Norman brick is used for the main portion of the exterior. The physical education building is the first provision for indoor sports for Manhattanville College at Purchase since these were curtailed with the move to the new campus. The swimming pool measures 100′ x 48′ and contains a six-lane pool with 6-foot wide side decks. Both one-meter and three-meter diving boards are provided. Depth varies from 12 feet at the diving end to 3 feet at the other end. The pool is faced with ceramic mosaic tile, as is the pool deck. A bowling alley is located in another portion of the swimming pool wing.

Georgian exterior

Double bedroom

Spacious wardrobes

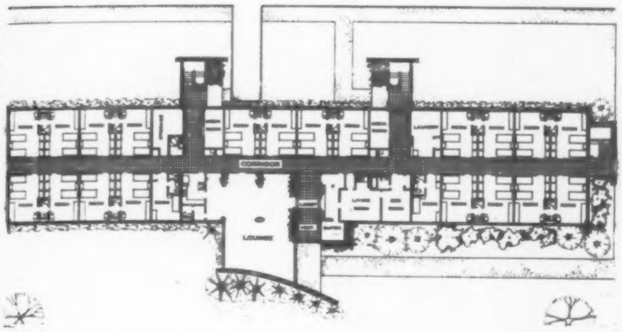
Reception room

Joseph W. Molitor

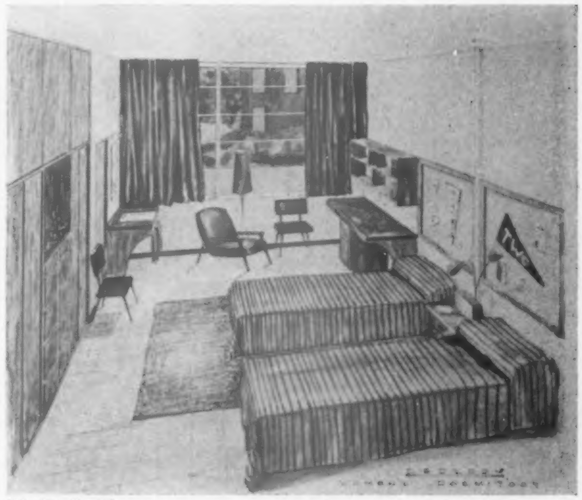
The brick Georgian dormitory, housing 106 students at Bates College, Lewiston, Maine, was constructed at a cost of approximately $520,000. The structure was erected as a part of the college's 100th Anniversary Development Program, which is to be completed in 1964. Furniture was designed especially for the dormitory by the Paris Manufacturing Company of South Paris, Maine, and has proved so well suited for this type of use that the manufacturers have placed the bureaus, desks and chairs into production as their "Bates Group." Each of the first two floors has a kitchenette off the reception rooms. The building has masonry bearing walls, floors of steel joist and concrete slab construction. The roof is wood joist and is cut off from the floor below by steel joist and concrete. Dadoes in the corridors are of vinyl fabric applied to the plaster walls. Architecture harmonizes with the adjacent Fine Arts group.

Women's Dormitory
Bates College
ALONZO J. HARRIMAN INC.
Auburn, Maine

Don Wallace Inc.

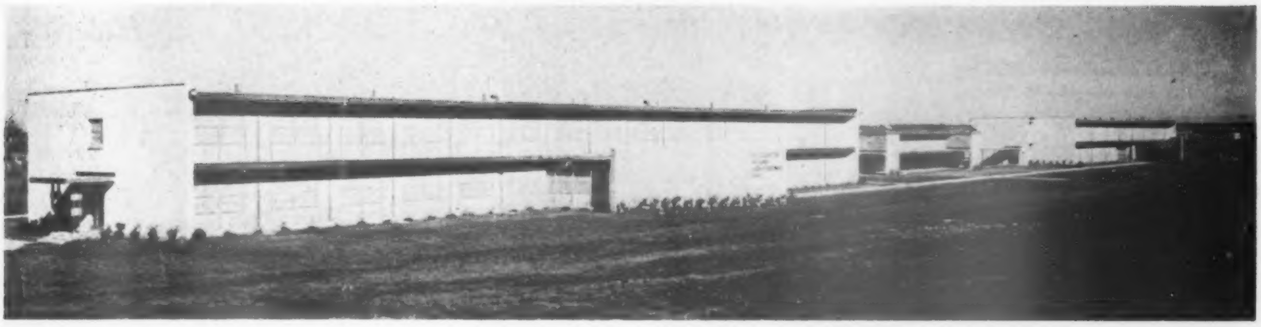


Dormitory floor plan



Double bedroom

W. D. Smith

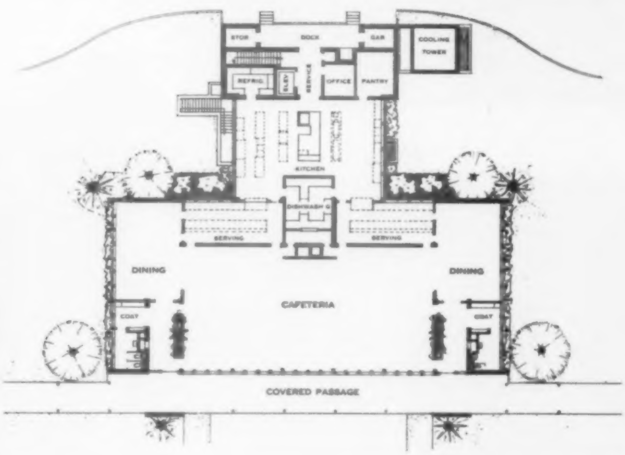


Dormitories flank cafeteria

Don Wallace Inc.

Cafeteria interior

W. D. Smith



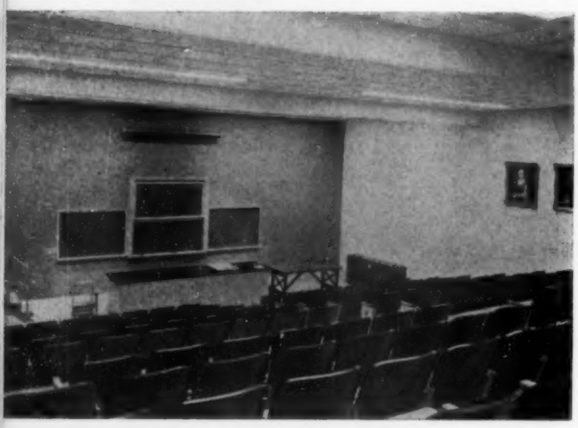
Cafeteria floor plan

A Women's Dormitory and an identical Men's Dormitory, with the floor plan reversed, are located on either side of the new Cafeteria building for Texas Wesleyan College, Fort Worth, Texas. Costs amounted to \$1,183.535, with \$426,073 for each dormitory and \$331,389 for the cafeteria. Dormitory exteriors are of brick and fieldstone, with aluminum windows and insulated wall panels of enameled aluminum. The second story and roof are supported by steel columns. The plan includes summer and winter air conditioning. Each structure houses 99 students, office personnel and a house mother. Interior decoration includes many built-in features. The cafeteria exterior is of glass and aluminum paneling, trimmed in fieldstone to harmonize with the dormitories. There are a main cafeteria and two private dining-reception rooms. Twin counters serve the area.

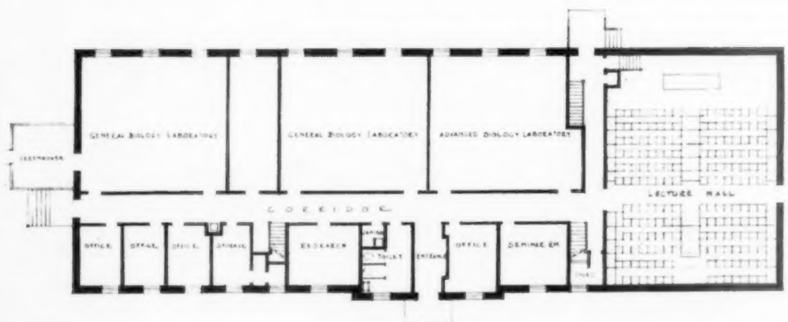
Dormitories & Cafeteria
Texas Wesleyan College
HEDRICK & STANLEY, Architects
Fort Worth, Texas

Science building exterior

Lecture hall

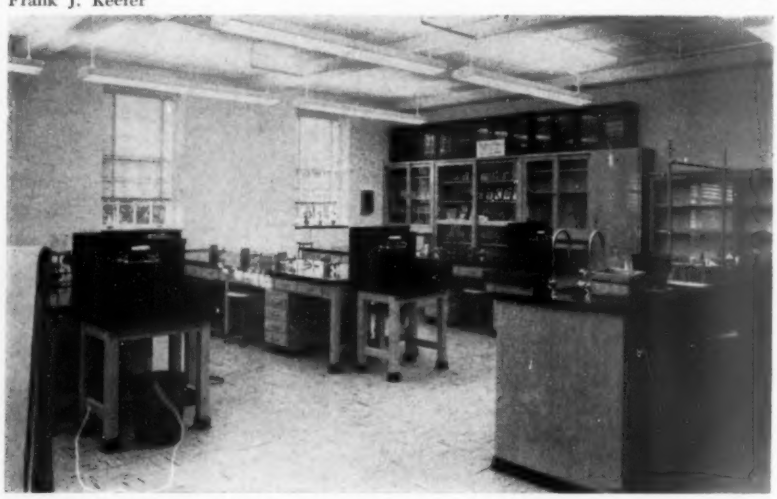


First floor plan



Frank J. Keefer

Laboratory



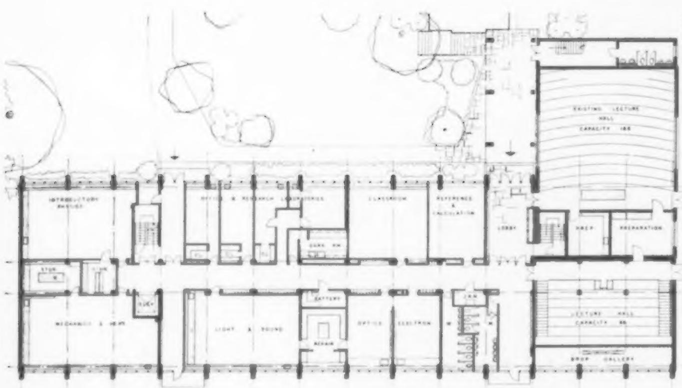
Laboratory

Hodson Science Hall
Hood College
HOPKINS & PFEIFFER, Architects
Baltimore, Maryland

A 14-foot square greenhouse is attached to the new Science Building for Hood College, Frederick, Maryland. Costs for Hodson Science Hall totaled $400,000. The structure is reinforced concrete beams, columns and floors, with steel roof trusses and a slate roof over 2-inch precast gypsum plank. The exterior is brick faced and walls are masonry bearing. Walls are slag block, painted, except in toilet rooms which have a ceramic tile wainscot. Lighting is fluorescent. Furniture includes science and laboratory tables, fume hoods, glass cases for storing apparatus, wood cabinet work, millwork and lecture room seating. Ceilings are suspended and are finished with acoustic tile. Floors are asphalt, vinyl and ceramic tile.

Exterior

Ace Hoffman Studios



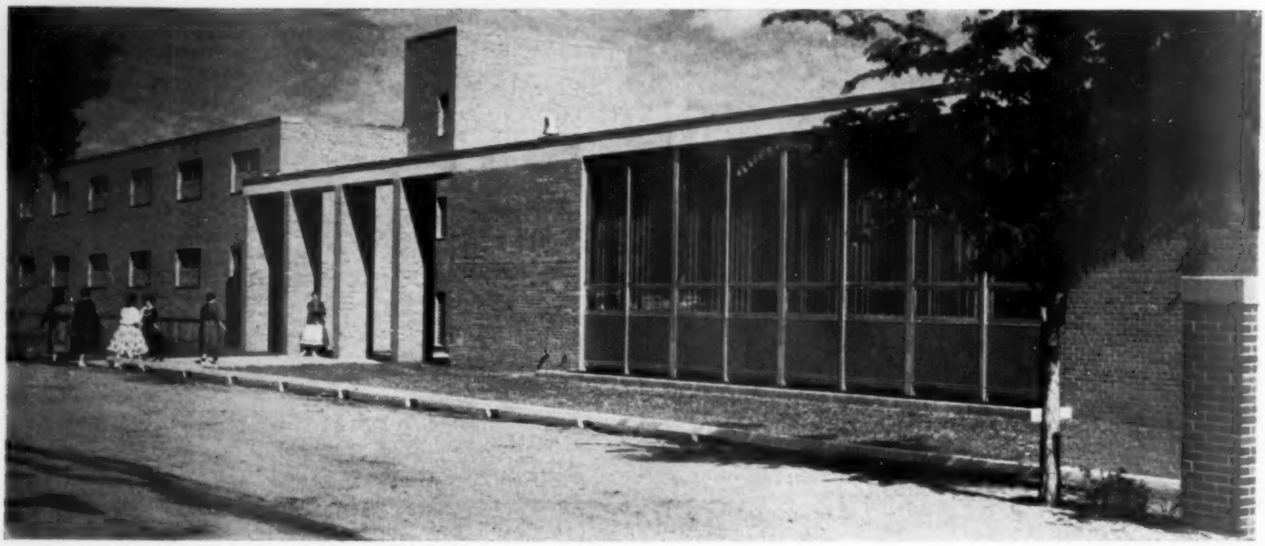
First floor plan

Toplighted corridor

Biology laboratory

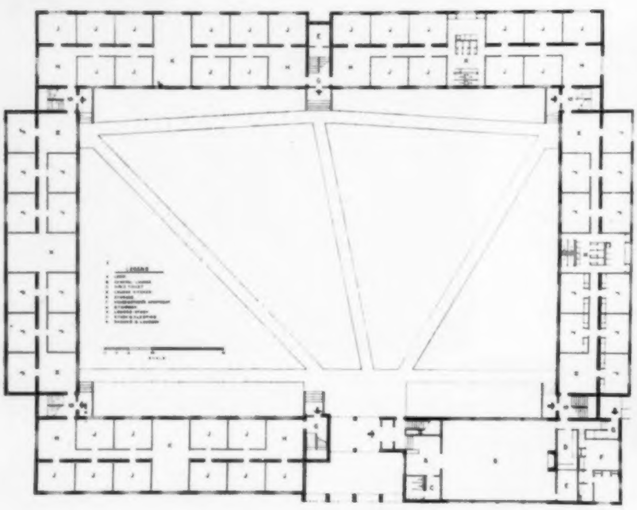
Harold R. Stark Science Hall at Wilkes College, Wilkes-Barre, Pennsylvania, provides laboratory, classroom and research facilities for the departments of physics, chemistry and biology, with all necessary storage and ancillary activities. The building is connected to an existing lecture hall which seats 200. Stark Hall is the first completely new building in a long-range construction program. The structure has concrete bents, 15′0″ on center, supporting one-way slab. There are no longitudinal or spandrel beams. Exterior walls are porcelain-enameled steel insulated panels with steel windows. Doors are aluminum. White sand-mold colonial brick piers carry some vertical services and rain water conductors. Interior partitions are painted cinder blocks. Laboratory furniture is honey maple, with black stone or stainless steel tops. Millwork was locally fabricated. Total costs for the building were $948,036.

Harold R. Stark Science Hall
Wilkes College
LACY, ATHERTON & DAVIS
Wilkes-Barre, Pennsylvania



Main entrance

First floor plan



Double bedroom

General lounge

Women's Dormitory
Jamestown College
LANG & RAUGLAND, Architects
Minneapolis, Minnesota

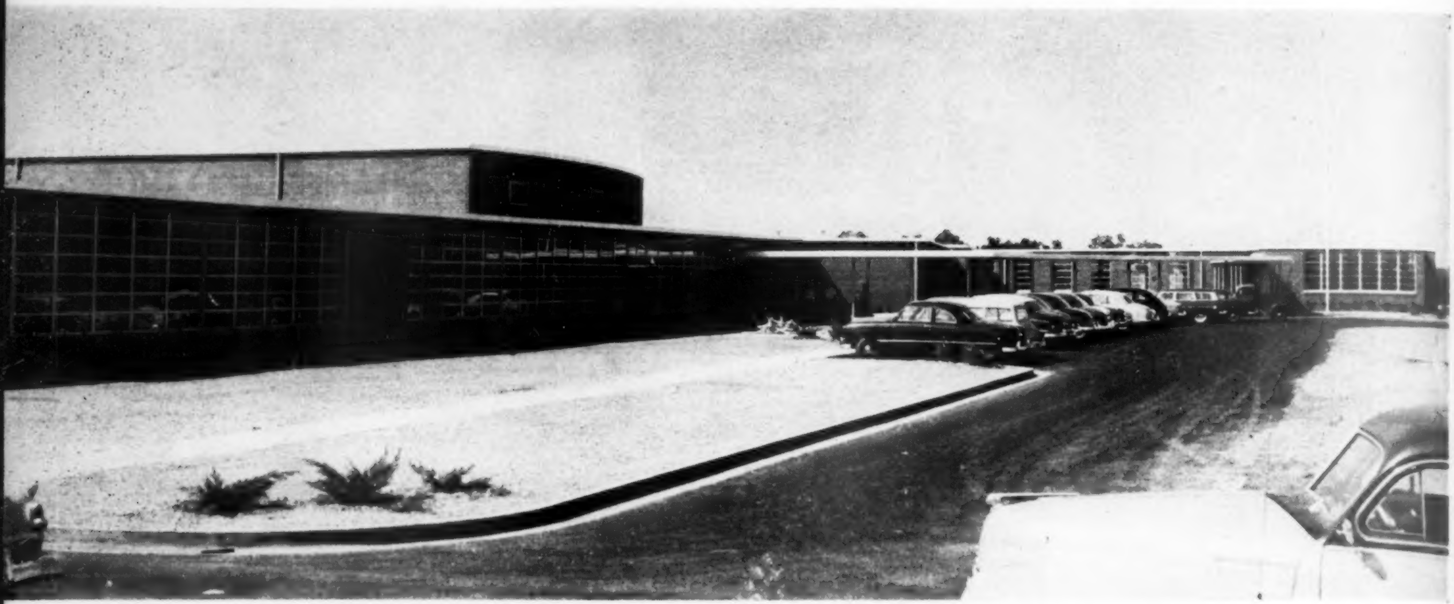
The new Women's Dormitory at Jamestown College, Jamestown, North Dakota, was designed to house 200 girls. The building was planned by architects Lang & Raugland around a central court. Entrance to all units is from within the court. The basic plan provides each ten girls with a study lounge. Between each unit of ten is a toilet, bath and laundry facility, used jointly by two groups of ten. There is also a large lounge with a recreation room. Apartments for the house mothers flank the lounge. The load bearing block walls have a face brick exterior. There are bar joists in floors and ceilings. Walls are plastered throughout. Wardrobes within the rooms are prefabricated. Furnishings and decorations were designed by the college staff. Total contracts for the building's construction amounted to $604,664.18.

PLANNING SCHOOL AND COLLEGE PLANTS

WHAT IS A SCHOOL BUILDING? Is it merely a combination of brick, mortar, steel and glass, arranged to accommodate a certain enrollment and program? We think not. A school building should radiate the spirit of its whole reason for being—the people who teach there, the youths who learn, the community served.

For elementary and secondary schools, educators and community members have vital roles in the planning processes behind new schools. The architect, with the all important task of interpreting educational program into a structure of good design, has much to contribute to planning sessions. Colleges, too, are realizing the importance of teamwork in planning and are avoiding many of the dictatorial procedures of past planning ventures.

Continued awareness of how much good planning means to a new building has added to the success of completed structures. The result cannot help but produce designs that consciously translate structural materials into living buildings.



The Blue Ridge School, Greenville County, South Carolina, is located on a high mountain range with magnificent views in all directions. This modern school has been planned so that it will serve the youngsters of the community for many years, without danger of failing to suit the program, no matter how it changes.

DON'T LET INADEQUATE PLANNING SPEED OBSOLESCENCE OF NEW SCHOOLS

by N. L. ENGELHARDT, SR.

Engelhardt, Engelhardt, Leggett and Cornell, Educational Consultants, New York City

Dr. Engelhardt has been engaged in school building planning activities since 1916. As a professor of educational administration for twenty-seven years at Teachers College, Columbia University, he taught courses in school surveys and school building planning to many who now occupy positions as school administrators. The firm of Engelhardt, Engelhardt, Leggett and Cornell has conducted school building surveys and has planned school buildings for hundreds of communities in all parts of the United States and in other countries of the world.

AMERICA'S dedication to education for all her children means that school buildings will bulk large for all time in the nation's construction program. This has been true of the past. The national population curve in its unbroken upward swing from 170 million persons to 200 millions and beyond makes it equally true for years to come. The housing of school children is the obligation of the community. History repeats itself. On each occasion, when local school building needs appear, the taxpayer re-echoes the questions raised on earlier occasions of need:

1. How long will the proposed school building serve our community?
2. Will the educational changes of the next 25 years or so dictate its early replacement?
3. Is the planning sufficiently flexible to assure the maximum of future adaptation in all major phases of the structure?
4. Will the taxpayers still be paying on the original bonds, even after the building has ceased to serve?

5. Is the building in reality part of a far-sighted and officially approved community plan?
6. Have the foreseeable advancements in the physical sciences, the communication arts, and the building utility services and the like been considered for their impacts on the life of the building?
7. What is the building capacity?
8. Is too large a school being planned?

Questions like these were raised in 1890, 1900, and in each succeeding decade. They are still being asked in the 1950's and probably will be for decades to follow.

School to Serve Present and Future

The interpretation of future services required of a school building is made without too much assurance of reliability. The school building requirements of today are vastly different from those of 1900. Why are doubts being raised today about the educational desirability and adequacy of the substantial structures built in the early part of the century?

Some basic reasons are found in the commonly accepted and delimiting definitions of the program of public education. That education is a dynamic and constantly changing force and not merely a static program has become a more widely accepted idea as the decades have passed. "What was good for my father and grandfather is good enough for my children" is far less frequently heard in today's public meetings than forty and fifty years ago. Education for the "Atomic Age" and other foreseeable "ages" that have not yet arrived will, without any shadow of a doubt, be different from that of decades past.

Inevitability of Obsolescence

Schoolhouses, like all other structures built by man, become obsolescent. The rapidity of the process varies. War and the elements may destroy and impair usefulness. Even so the battle against obsolescence is usually a losing one for mankind. Man is constantly pitting his desire and ability to create anew against his intent and effort to maintain the structures he previously labeled as superior or marked for long-time service. Obsolescence frequently derives from lack of the "forward look," blind adherence to the traditional, and the failure to acknowledge the unlimited capacity of human growth in all fields of endeavor.

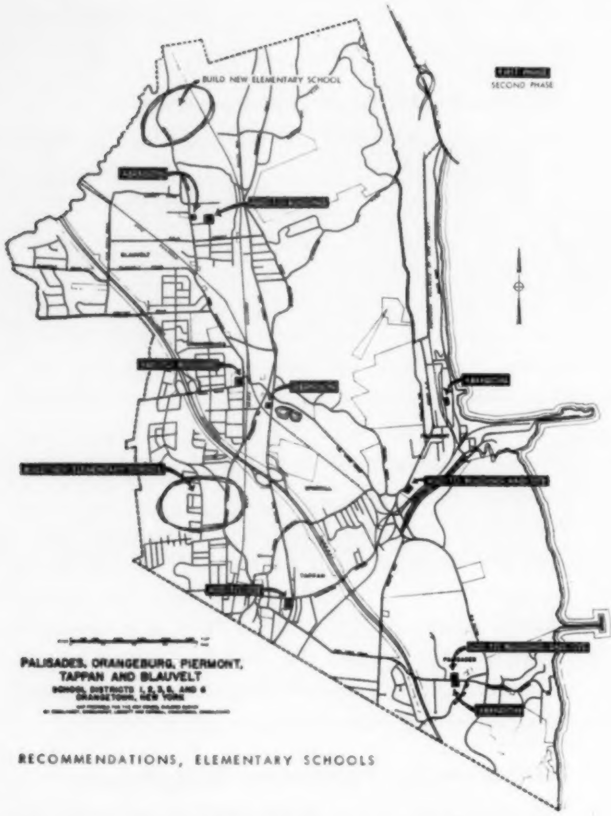
In spite of all remedies that may be applied, obsolescence will continue as a cancerous force reducing the age-span of man's structures. Buildings, like human beings, will continue to die. What then is a desirable and serviceable life-span for buildings, particularly school buildings, and how can obsolescence be delayed or postponed over a reasonable number of decades?

Temporary vs. Permanent Schoolhouses

The past fifty years, 1910–1960, have witnessed an increasing emphasis upon permanence in school building construction. World wars brought the portable building into the picture. "Temporaries," "movables," "barracks" were names defining their character. The question is often asked: Why not continue to build

Permanent housing developments are designed for the whole lifetime of one and perhaps two or three generations of a family. The values of these homes should be protected by up-to-date schools, well built; not in any sense extravagant, but which will utilize completely the products of American labor.

Morgan Fitz



RECOMMENDATIONS, ELEMENTARY SCHOOLS

Here are five rural school districts which overnight have taken on the characteristics of the new suburbia. The Hudson River Bridge at Tarrytown, New York, and the Parkway developments in northern New Jersey, have brought in hundreds of new homes where few existed previously. New homes, new babies, new schools is the chronology. Before all land is gobbled up for non-school purposes, the survey report alerted the citizens into productive action. First they voted to centralize and then to secure new sites or increase existing sites, and to plan new school buildings or to add to satisfactory old ones. Without a unified program, school problems would seem insoluble.

"temporaries," of light construction, probably non-fire-resistant, and designedly replaceable after a short life of service? The fact is that "temporaries" tend to become permanent. In some communities the portables of World War I were refurbished during World War II.

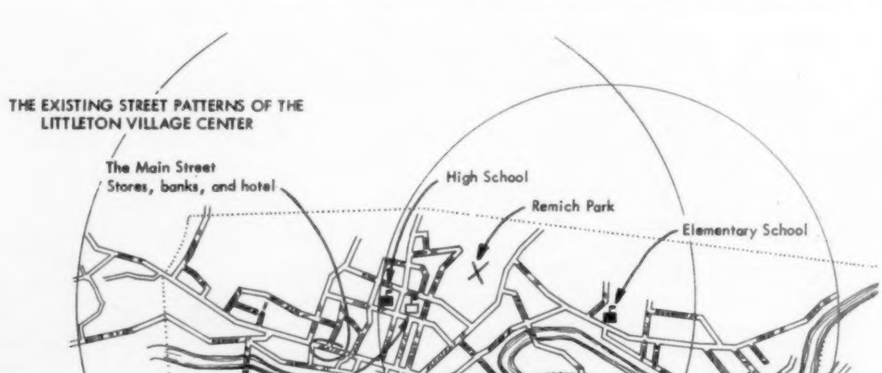
There is no assurance that the "temporaries" will give satisfaction either financially or educationally. They tend to become eyesores in the urban picture. School systems may now and then discuss and even reintroduce "temporaries." Public pressure tends, however, to direct the building program back to the permanent type. Then the investment in portables moves to a low point in values.

Permanent school buildings may be thought of as those which at least serve adequately during the period of community payment of the bonds which financed their existence. Twenty-year bonds tend to predominate today. For some buildings thirty-year bonds are issued. In fact, there seems to be no reason why permanent school buildings should not continue to serve satisfactorily for at least one hundred years. The public record is, however, that many school structures have reached the end of satisfactory educational service within fifty, forty, thirty, twenty, and even fifteen years. Certainly the importance of public education as one of the greatest forces in community development, the prudent process of community financing, and the maintenance of community morale emphasize the desirability for long life of school buildings.

Assurances for Building Longevity

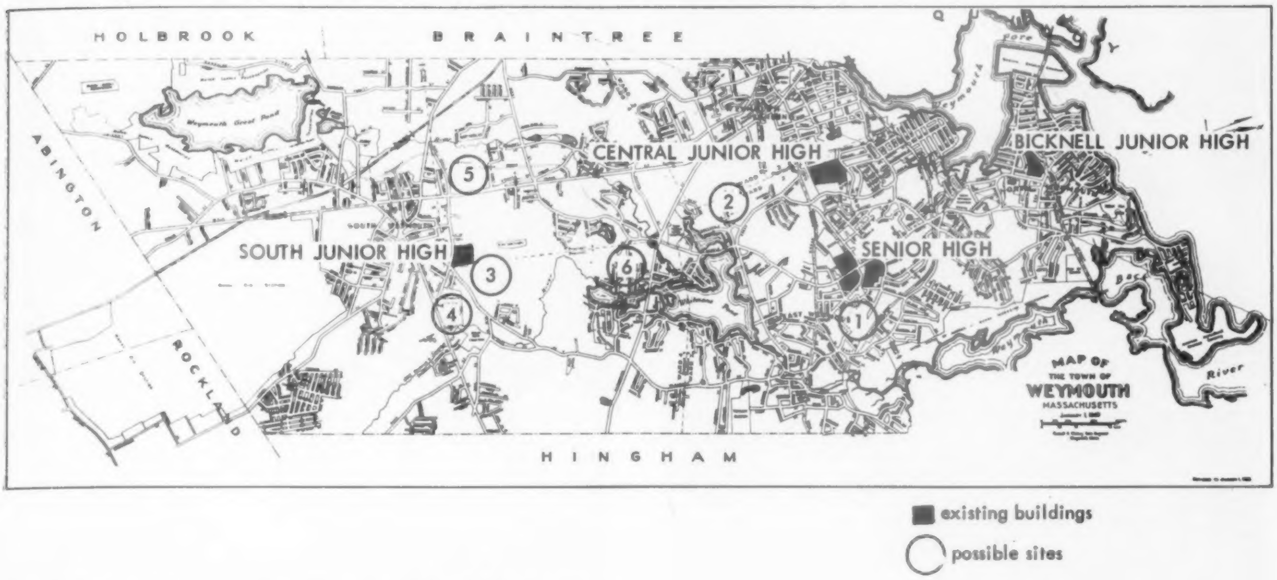
Boards of education make their best investment in school buildings in the care given to each of the following series of problems.

a. The members of the board and its administrative



On this map are shown the present high school on its limited site and the new elementary school on Pine Street. The St. Rose Elementary School is also shown on its limited site next to the high school. Littleton is a town divided by a river and a railroad. On Main Street are the majority of business stores. Homes recede to the north up the abrupt mountain inclines. A similar situation, but in lesser degree, characterizes the central south side. Homes tend to be erected at the extremes of this map because of easier construction and the density of the central part.

Small communities, whose street patterns were determined years ago, should apply modern criteria to any proposed changes that are made today. Most communities, both large and small, tend to grow. Here is Littleton, New Hampshire, with schools built on limited sites, and streets planned largely in terms of horse and buggy days. Littleton is growing. Where should the new schools be? How much growth may be expected out of such developments as a new hydro-electric station recently dedicated there?



A rapidly growing community with areas still available for future school purposes is the town of Weymouth, Massachusetts. Existing secondary schools are shown on the map, with possible sites selected for new school units.

officers should acquire awareness of each step in the school planning and building process.[1]

b. School building planning should be thoroughly integrated into the comprehensive overall plan of the district served.
c. The board of education should plan each building as a part of a previously prepared and officially approved long-range site and building program that ties in with the adopted educational organization, and such adaptations as appear imminent.
d. Without a program of educational specifications, thoroughly analyzed and approved by the board's appointed educational committee, no building enterprise should be undertaken.
e. The fitness of site standards to present-day as well as future requirements must be fully recognized in official records.
f. Full provision should be officially made before construction is initiated so that specifications for safety, sanitation and human comfort indicate the coverage desired.
g. Thoroughly developed maintenance budgets for preservation of community investments in existing plant facilities should be a fixed board of education policy.
h. The thoroughness of the comprehensive planning should reduce to a minimum temporary, emergency or interim building propositions.
i. Educational needs and functionality, and not architectural design, should have first consideration in the planning of all school buildings.
j. All building expenditures, including the mechanical costs, should be incurred on the basis of low installation costs, long-time utilization, and low maintenance and repair charges.
k. Multi-purpose educational planning must assure satisfactory adaptability to all the proposed uses.
l. A long-time building budget should be planned about present and future needs, the sources and amounts of income, the reduction of existing debt, and the impact upon present and future tax rates.
m. Continuity of planning, frequent review of past errors as well as accomplishments, and constant analysis of educational change, in all its implications, characterize the most acceptable and successful kind of administration.

Complete Official Understanding

The school planning and building processes cannot be well done without the participation of many—those who pay the costs, those whose children are served, the teaching and supervisory groups who use the facilities, the board of education and its administrative staff, the specialists employed to plan and create, and the contractors who build. What are all the steps involved from initiation to dedication? Planning proceeds best and without unexpected changes when the steps are fully understood in advance.

Many schoolhouses were erected in the past (but fortunately fewer are today) when the official commission, reduced to its simplest form, might have been—"there's the site—build us a school." Built sturdily, such schools may have served long; their curtailment of educational progress may never be calculated. Inevitably some day the community finds out that building a better school involves complete appreciation of the processes

[1] N. L. Engelhardt, N. L. Engelhardt, Jr. and Stanton Leggett. *School Planning and Building Handbook*. New York: F. W. Dodge Corporation, 1956. 626 p.

Four different types of primitive schools have been serving western Greenville County, South Carolina. Such schools were obsolescent from the very beginning.

and helpful activity by many persons. With today's high costs, no other practice can be defended.

Concomitant with Community Planning

Community planning, with due attention to zoning, major street layouts, parks and playgrounds, parking and parkways and the like, makes for the best kinds of places in which to live, work and bring up families. Failure to integrate the overall school plan into such community planning may be disastrous. Schools built on small sites near existing, expanding, or possible future industrial or commercial developments drop their investment values fast. They are bound to recede rapidly in their educational desirability. Not many eager buyers are, as a rule, to be found for obsolescent schoolhouses.

Nearness to a present housing density, low cost of land for which no other buyers are in evidence, approval of a site because the community had since time immemorial had a school there, purchase of a site backed by political pressures, banking interests or the urging of a friend, are unacceptable criteria for making it a part of a school plan. It may well result in earlier obsolescence and loss of investment.

Comprehensive School District Plan

School officials know the land boundaries of their district. The erection of one school building without assurance that it is an acceptable part of a community-wide plan is an administrative weakness that cannot be condoned. All the areas in a district, be it large or small, may sooner or later need school buildings of one kind or another. What provision can be made to reduce error, eliminate duplication, and assure fairness to all sections?

The comprehensive district site plan comes first of all. Thus pressures of various sorts at time of emergent purchases can be eliminated. An approved, widely publicized and district-wide site plan tends to become accepted without hampering debate, if it can be proven that selection has been done impartially and in terms of children's needs.

The school plant program, built upon well-established priorities, and embracing many years, tends to become established in citizens' minds and to become accepted as a pattern of community growth. Anticipated needs based on complete and continued study dictate the building of a structure, and not the pleadings of dissatisfied parents, nor the promptings of forces interested in sectional politics rather than the whole community's schools. With the need and the planning, backed by the most thoroughly acquired data, buildings are assured of longer life than one foisted upon a community by hysteria or political strategy.

A long-range program for school location and erection carries the advantage of securing adequate sites.

A site of limited area tends early and rapidly to reduce the value of the building placed thereon. It may create teacher as well as parental discontent. The neighbors may be constantly struggling for their rights. The necessary expansions cannot be made. If done, on the other hand, the play facilities are reduced for an even heavier enrollment. Very little, if any, support can be given the small site, resulting from lack of a comprehensive plan.

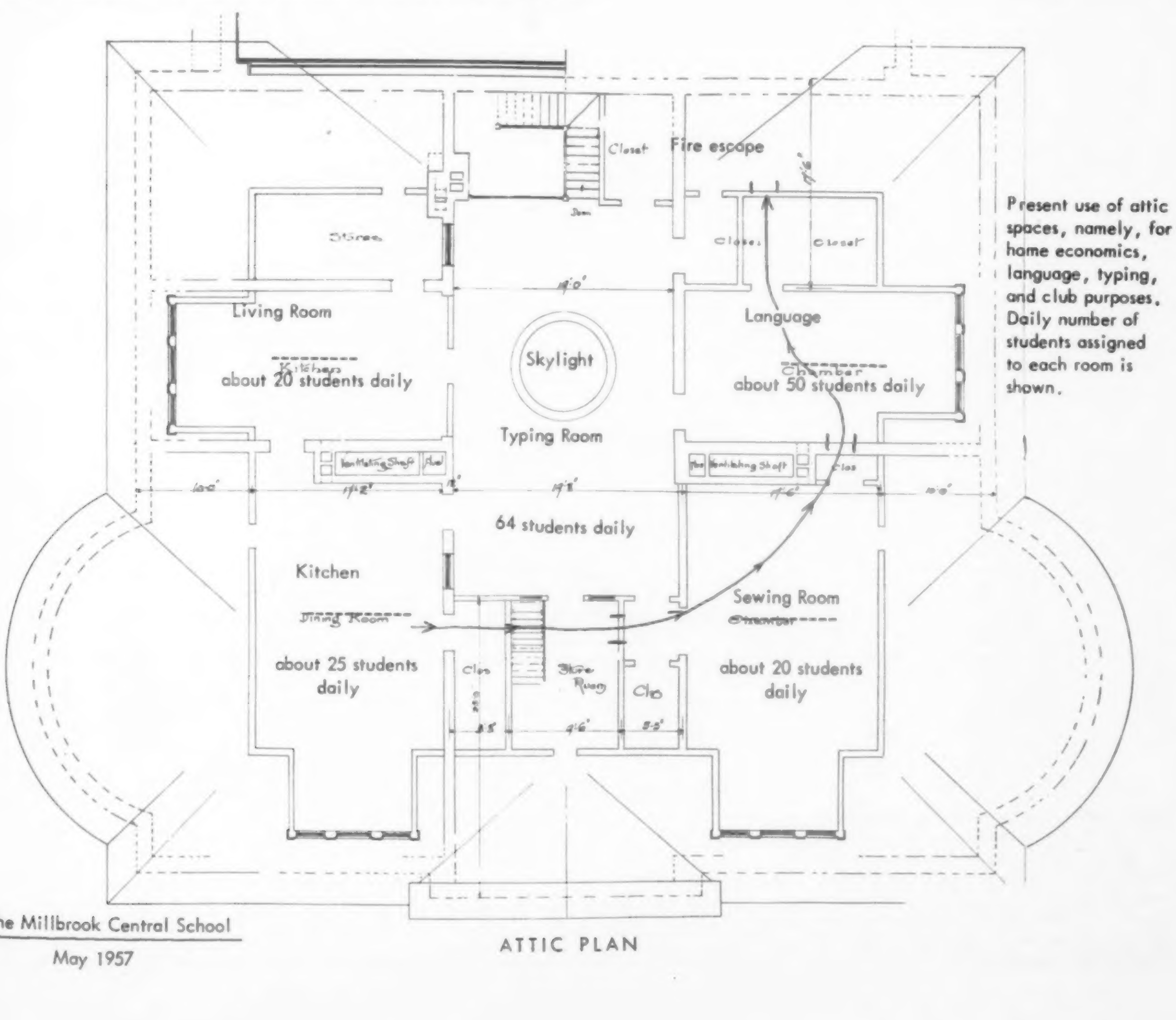
Role of Educational Specifications

Addressing a conference of architects, the writer mentioned a set of educational specifications for a new high school building that composed a volume of 200 pages. A member of the audience cried out—"That I have yet to see." It is quite true that in the past the educational specifications furnished the commissioned architect have tended to be meager indeed. In fact, in the twenties, only one sheet or so was handed out. Schools planned with such limited educational assistance had "OBSOLESCENT" written across their façades on the day of dedication.

The program of educational and community requirements, prepared in February, 1956, by the writer as a workbook for teacher study and suggestion for the New White Plains, New York, High School, had the following table of contents and ran to 227 pages:

The Program of Educational and Community Requirements
Planning the Use of the High School Site
Characteristics of a Modern High School
Some Generalizations Regarding High School Buildings of the Future
Types of Space Groupings in the New White Plains High School
Considerations for Classroom Design
Classroom Adaptations for Specific Subject Matter Fields
The Arts and Crafts
Facilities for Homemaking Education
Music
The Physical Sciences
Business Education
Industrial Arts
The Library
The Auditorium
Planning the Cafeteria Facilities

Planned in 1894, this third floor attic plan was a custodial apartment in a small high school. Its conversion for instructional purposes in 1957 is shown. Rooms have a safety exit, without which such conversion would not be satisfactory.



The Millbrook Central School
May 1957

ATTIC PLAN

Health and Physical Education
Administrative Offices, Attendance Office, Guidance Area, Health Suite, and Teachers' Rooms
Student Activity Area and Student Service Provisions
Plant Service Facilities
Building Communications Service
Review of Major Factors in Site Planning

A copy was furnished every teacher. Each accepted the responsibility of learning the proposals about the entire school and of making specific recommendations concerning his or her classroom, laboratory, or the like. The next edition of this workbook included the agreed-upon educational recommendations and became the architect's basis for planning.

It certainly is logical and rewarding, from a business point of view, for the architect to have every educational, administrative and custodial detail before he begins his planning. It is reasonable to expect a longer-lived building as a result.

Acceptance of Site Standards

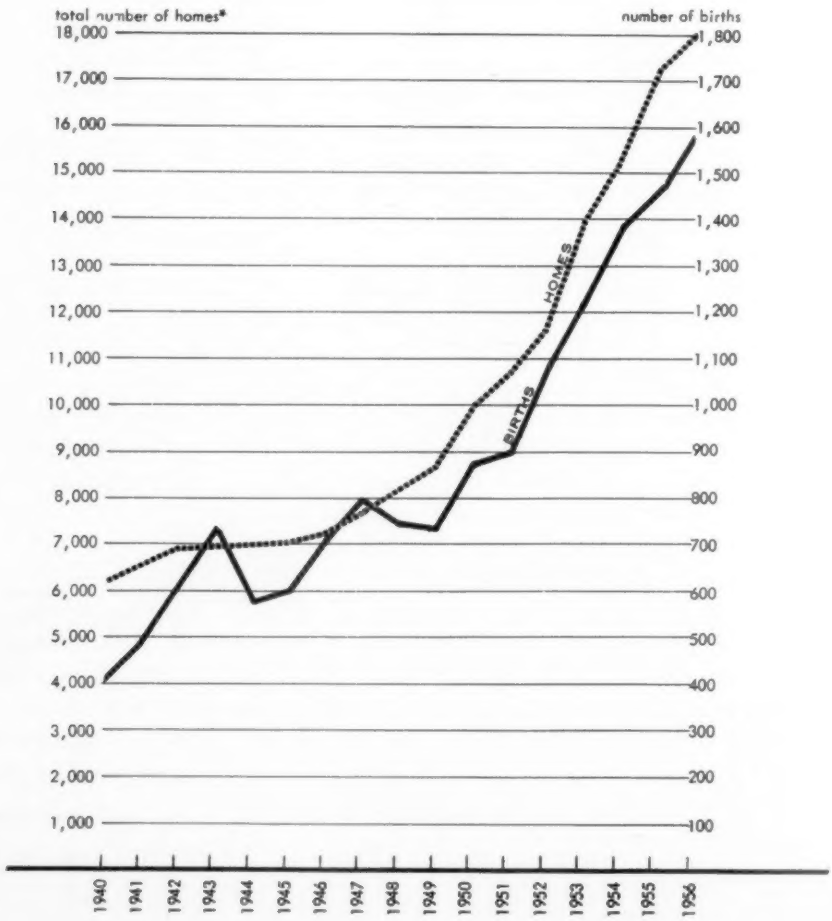
High school sites of twenty acres, selected 20 to 30 years ago, are today frequently found to be inadequate or embarrassing to say the least. Today, sites of 40 to 100 acres for high schools, have tended to become widely accepted.

The change from the limited acreages of the years 1900 to 1930 has come not only in the high school field but also in the elementary and junior high. Many reasons for this have been brought together in checklists recorded in the Engelhardt Handbook.[2] School building survey reports bring to light case after case of recommendation for abandonment of a school building because of site limitations and the impossibility of adding to the site without excessive cost for land and encumbrances. If a community wants to see the obsolescing process take place rapidly in a new school building, selecting a limited site is one of the historical methods for producing this effect.

Safety, Sanitation, Human Comfort

A fire escape hanging on the exterior of a building is not only deceptive from the standpoint of assurance of safety, but it also is a public confession of lack or failure to plan adequately for safety. Parents rightly protest when safety has not been fully incorporated into all the elements of planning. They do not want their children in schoolhouses that appeared safe but produced the disasters of the following table:

[2] Ibid., p. 254ff.



Good planning compares the growth of homes with the birth trends. Where homes are actually built, as in this case, future school sites should recognize this permanent development. Chart shows the growth in total number of homes and number of children born annually in Woodbridge Township, New Jersey.

*Based on estimated 18,000 one-family dwelling units in 1956 and building permits issued 1940–1956

IN MEMORIAM—to the children and adults whose lives have been sacrificed in school building disasters

1908	Collinwood, Ohio	175	Lives Lost
1915	Peabody, Massachusetts	22	"
1917	Asheville, North Carolina	7	"
1922	Covington, Georgia	2	"
1923	Camden, South Carolina	77	"
1924	Babbs Switch, Oklahoma	36	"
1930	Troyon, Oklahoma	3	"
1937	New London, Texas	294	"
1954	Cheektowaga, New York	15	"
1957	Mt. Airy, North Carolina	2	"

Unsafe and insanitary buildings age fast. Even their rehabilitation does not wipe out the community memories. Poorly lighted and inadequately heated buildings tend to breed disrespect and the desire to eliminate such buildings from the community picture. Today's community policy tends rapidly to replace school buildings which represent hazards to life or health.

What Is Necessary Maintenance?

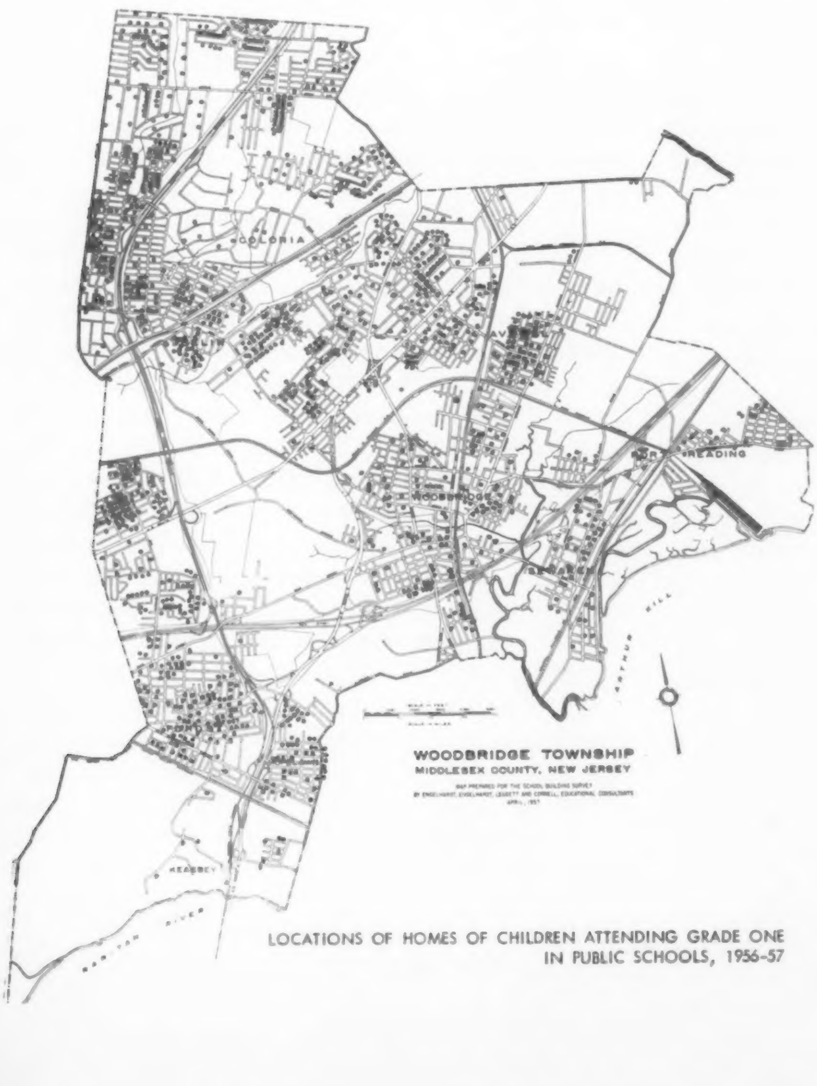
A protective maintenance program is just as essential for school property as food is for human beings. The lack of a maintenance program has shortened the life of many school structures. Maintenance should begin its operation the first year of a building's existence and should continue undiminished over its entire life.

Temporary Buildings

Every business manager would recognize that temporary buildings are rarely defensible. This is an ideal policy. The assumption is that the school system itself will have such comprehensive planning that all emergencies, except those resulting from an "Act of God," are foreseen and provided for in a regular plan. The place of public education in community life is demeaned when frequent recourse is had to "barracks" or temporary housing. A community rejects such housing in due time and probably in many instances long before the investment has made a full return. Long-time use of emergency housing certainly must cause students to lose respect for themselves as well as for their community.

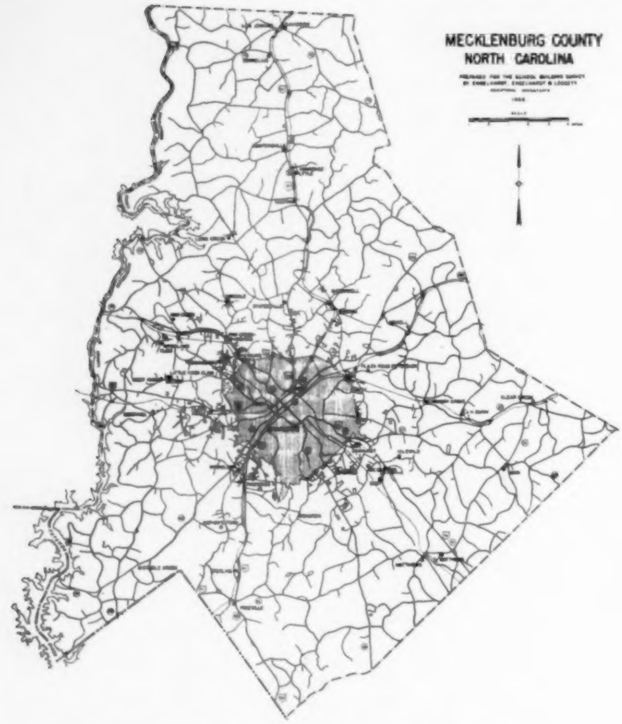
Priority of Emphasis in Planning

The architect's preference for a traditional design should not have priority over educational function in deciding the character and contents of a building. First consideration in all school building planning should be the educational advantage gained from size of class-



LOCATIONS OF HOMES OF CHILDREN ATTENDING GRADE ONE IN PUBLIC SCHOOLS, 1956-57

The residential locations of children attending grade one will help to determine where new schools will be built and where additions to old schools will be scarcely defensible. Part of a school building survey in Woodbridge Township, Middlesex County, New Jersey, was the locating on a map of the homes of all first graders in the community.



Many cities of over 100,000 population are constantly expanding their boundaries. Charlotte, North Carolina, is a good example. Charlotte and rapidly growing Mecklenburg County, which surrounds it, participate in joint planning around the city's periphery.

rooms, the character of the homemaking department, and the hundreds of other educational facets. Architects in recent years have been making rather remarkable progress in recognizing this important criterion of planning.

Economy in Planning

Economy in school building construction is not necessarily found in the elimination of a space nor in the reduction of classroom areas. The comment is frequently made that class sizes have been reduced steadily to the range of 25 to 30 pupils per class but that room sizes have not been reduced correspondingly. The educational program has, however, improved to the point where larger classroom areas are necessary. Classroom sizes used early in this century would bring about early obsolescence in a new school building and a disregard of the inevitability of educational progress.

Economy is assured if longtime utilization can be foreseen. The day will come when low maintenance and repair costs may also be predicted because of the knowledge the architect and engineer have of the materials and equipment which they have included in their building specifications. "Economy" always finds its strong protagonists. They do well to analyze the difference between a "true" and a "false" economy.

Planning for Multi-Purpose Use

There will be no end in the future to the search for genuinely satisfactory multi-purpose use of space. Where this can be achieved satisfactorily acclaim will be given. Planning should insure, however, that no vital school function is destroyed or maimed in the process of planning for multiple use of space. The South Hagerstown High School in Maryland, opened in 1956, represents planning which has taken full consideration of multi-purpose space possibilities. The chances are that the building on its adequate site will serve the community for a hundred years and more.

Long-Time Building Budget

The writer and his colleagues have long emphasized the desirability of instituting meticulous budgetary policies and practices. Incomplete and inadequate budgets hamper school building planning. A checklist for such a budget appears in the Engelhardt Building Handbook.[3] It is long and detailed but finesse in financing pays attention to every detail. Without doubt, the lack of an adequate budget proves frequently disastrous and tends to secure less satisfactory buildings and therefore those of shorter serviceability.

Continuity of Planning

In the school board office of Charlotte, North Carolina, hangs a map of the city with priorities for site and building action. The map at a glance tells the story of school buildings of the past but it also helps to assure continuity of planning. To reduce obsolescence continuity of planning school facilities must be administratively assured. Such continuity involves the annual analysis of educational offerings, the review of facilities which have been recently built, and faculty conferences on what not to do again or what best to do to provide for the morrow. School buildings should be built for long-time use. This can only be accomplished through highly cooperative lay and professional service.

[3] Ibid., 154ff.

THE ARCHITECT'S OBLIGATION TO HIS CLIENT

by JAY C. VAN NUYS

AMERICAN SCHOOL AND UNIVERSITY is deeply honored and privileged to present this article by late architect, Jay C. Van Nuys, written shortly before his death in October, 1957. Mr. Van Nuys was widely known and acclaimed for his school designs. In 1956 he received a national award from *The School Executive* magazine for his design of the Hanover Park Regional High School in Morris County, New Jersey. This was the first campus type high school to be built in that state. Mr. Van Nuys and Charles Drahner of Newark were architects for the building expansion program at Trenton State Teachers College. He had been engaged in June of 1957 by the New Jersey State Board of Education as an architectural consultant to assist in preparation of a long-range program for each of New Jersey's State Teachers Colleges. Mr. Van Nuys was a graduate of Somerville High School and Pratt Institute in Brooklyn. He began his architectural career as a partner of his father in Somerville, New Jersey, in 1937.

SUCCESSFUL architect-client relationships must be predicated on mutual understanding and confidence. It is essential that the client have the utmost confidence in the personal and professional integrity of his architect.

Apart from the creative aspects of architecture and the production of adequate contract drawings and specifications, the architect has even greater responsibilities to his client. It is with these facets of architectural practice that we are here concerned.

The Architect as an Agent

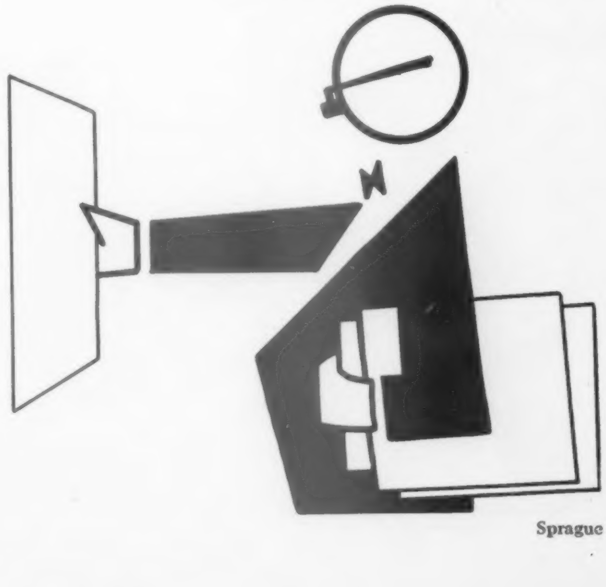
Throughout the life of a project the architect represents the client as his agent in many transactions. He will make decisions and recommendations that have far-reaching effects on the welfare and value of the project.

Initially, it is of the utmost importance that the architect carefully analyze the problem he has been retained to solve. His first obligation may be to challenge the basis of design criteria set up by the client. Many times accepted patterns of procedure and methodology are the results of inhibiting factors of the existing physical plant. If a new plant is contemplated, then these criteria are no longer valid.

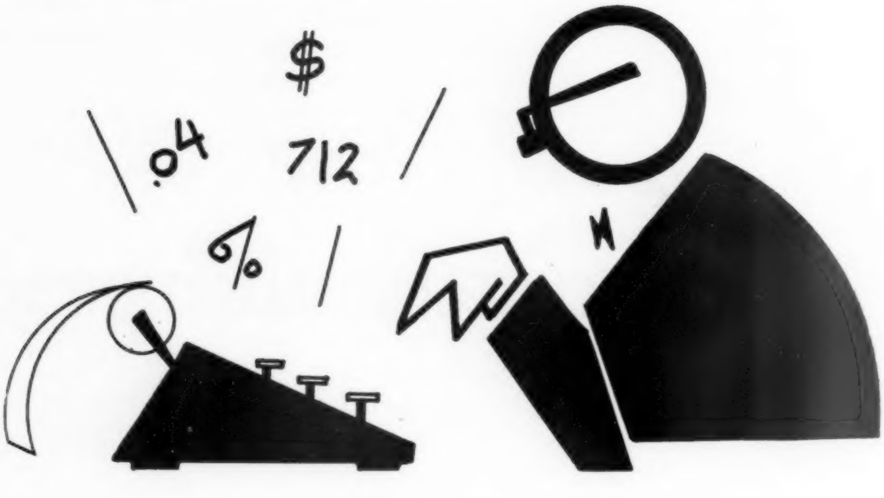
A fresh approach toward the seeking-out of pertinent facts and basic data may bring forth surprising answers. The understanding and recognition of fundamental objectives, the characteristics of people involved, the relationship of the project in question to the community and its environs all are a significant part of the architect's approach to a definition of the problem.

Intelligent questioning and factual allusions to similar circumstances often help the client to see himself and his problems in a different light. When this oc-

The architect should arrive at more than one design scheme to solve a particular new school problem.



Sprague



Perhaps one of the most difficult tasks facing architects today is the preparation of realistic budget estimates.

curs, the architect has performed a service in aiding to bring about the new outlook.

The Architect as a Designer

Now comes the responsibility of interpreting the new data in terms of architecture. Here again the architect faces an important obligation to his client to convert adequately the developed program into a design which will: (a) provide all of the necessary spaces, properly characterized and related; (b) be appropriate in terms of structure and construction materials; and (c) express usefulness and beauty. In other words, the result must be good architecture.

Explore All Avenues

There are always several ways to solve any problem and the architect should explore all avenues of approach. He should arrive at more than one scheme to solve the problem. Final choice should *not* rest with the owner simply because there are several solutions from which to choose. It is the responsibility of the architect to recommend the best solution and to point out to the owner his reasons for doing so.

The Architect as an Adviser

It is at this point that the owner is apt to assert his right to make final decisions. Obviously, it is the owner's money that is being spent. However, the architect has a professional obligation to make strong recommendations for decisions which he deems to be in the best interests of his client. These may not be—and quite often are not—the cheapest.

It should be emphasized that this does not mean encouraging a conflict of personalities based on personal tastes. If, after an analysis of the various aspects of the problem, the owner still insists on having his way, it is undeniably his right to do so. While such a result may obviously be a compromise, it should not be accepted as one until all of the solutions have been explored.

Perhaps one of the most difficult tasks facing architects today is the preparation of realistic budget estimates. Many times these estimates are determined be-

It is the duty of the architect to explain fully to the administrative, the teaching and custodial staffs the many uses to which their new school plant can be put.

fore the architect is retained. He is then instructed to design a building to house a certain program for a certain number of students to cost so many dollars. This not only is impossible in most instances but is grossly unfair to the architect. Such instructions become a mandate to the architect to design the cheapest possible structure effectuating all "economies," whether or not they be false ones.

There is, of course, a responsibility on the part of the architect to plan a facility for a given program and, before proceeding beyond the earliest preliminary sketches, to inform the owner of the probable cost. At this time it can be determined whether or not the scope of the project may be reduced if the cost is excessive, or whether it will be possible to obtain additional funds. A third alternative would be to build a plant in phases. Any one of the three possibilities need not reduce the quality of the building or of the architecture.

Architect as Construction Supervisor

In addition to the preparation of adequate contract drawings or specifications from the designs evolved, the architect is charged with the responsibility of administering the work during the construction phase. He often assumes the role of arbiter and finds himself in the position of settling actual or potential disputes between owner and contractor. This role calls for eminent fairness on the part of the architect and full recognition of his professional status.

The Architect and Legal Matters

Matters of a legal nature are constantly developing from the very inception of the project until the completed physical plant is turned over to the owner. While the architect may be expected to draw upon his knowledge, judgment and experience, he must, at the same time, be aware of matters requiring legal opinions. At all costs he should avoid rendering such opinions himself. His work with the owner's legal representative is to be undertaken in the spirit of cooperation that exists with consultants in other fields impinging on architectural practice.

Contracts Should Be Checked

A well written set of specifications can go a long way toward preventing ultimate disputes between contractors, owners and architects. The general contract conditions, along with the proposed forms of contract and bonds, should be checked by the owner's attorney before final acceptance.

If a school plant has been properly designed—in the sense that the spaces have naturally and properly evolved as a result of careful study of the program and its implications—the resulting building may be quite different from its predecessors in the community.

Program Develops Into Space

During the program analysis, carried out with the administration, the staff and outside consultants, the architect develops physical implications in terms of space, space relationship, environment and building character, from the various phases of educational program and philosophy. A thorough understanding of the operation of such a plant will exist among the architect, the school superintendent and one or two of the more interested board members. However, it is of the utmost importance to recognize that this knowledge is not shared by all who should be a part of it.

A spirit of cooperation should exist between the architect and the school client's legal representative.

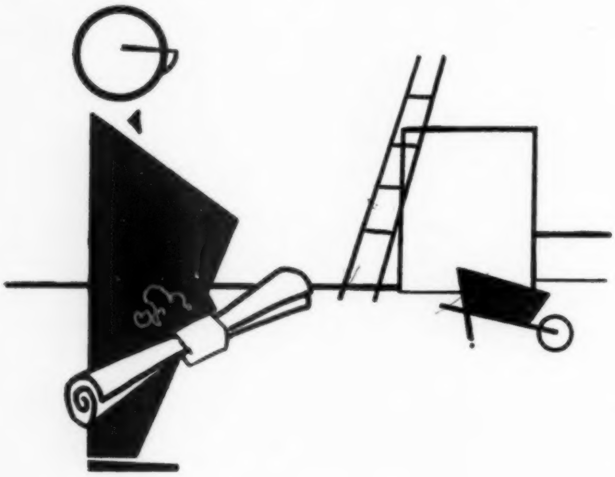
The Architect Explains Building Uses

The architect, therefore, has one final service to perform which can make the difference between a successful and unsuccessful project. He must explain fully to the administrative staff, the teaching staff, the custodial staff and even segments of the student body, the uses to which their new plant can be put. If a classroom has been designed for maximum flexibility, then all aspects of that flexibility should be explained to the teacher who will use the room.

Materials incorporated in the building and mechanical equipment should be described in a brochure, copies of which would be made available to the administrator, the school board and, most important of all, the chief custodian or superintendent of buildings. Such a brochure eliminates frustrating questions relative to maintenance, replacements and operational problems.

Understanding Means Wise Use

If a teacher is aware that several furniture arrangements are possible in her classroom, if the chief custodian knows the purpose of certain ventilating equipment, and if the superintendent, teacher of dramatics and those in charge of stage operation are shown all the potentials of the expensive backstage equipment, these facilities will be better understood, appreciated and will be well used by the occupants of the new school plant.



The architect is charged with the responsibility of administering the work during the construction phase of a new school plant program.

WHEN NOT TO PLAN AN ADDITION

by ROBERT H. LIENHARD

Partner, The Malmfeldt Associates—Architects, Hartford, Connecticut

Robert H. Lienhard is a practicing architect and a member of The Malmfeldt Associates. As a designer he has participated in well over a hundred of the school projects that dot Connecticut towns and cities. Currently, his firm is engaged in planning a new high school to replace the historic Hartford Public High School. Mr. Lienhard is a graduate of Yale University.

ARCHITECTS whose major practice is the design of schools are aware that additions play an increasingly important part in this practice. Many offices, like ours, have planned additions for schools built since the war. This evidence of growth outstripping all predictions has made the architect more than ever cautious to consider possible expansion in his design of new schools. In fact, it is now common practice to design a school for its full potential, and then to consider what portion can fulfill immediate needs.

Unfortunately, provisions for future additions to many new schools have been rather casual. An open ended corridor is often the extent of foresight in this regard. When additions become a hard reality it is usually found that core facilities such as administrative, teachers and health rooms, cafeteria, kitchen and auditorium will be overtaxed. Mechanical extensions to boiler plant, water system and sewage disposal may involve redesign or replacement. Thus, with some recently built schools the assumption that additions will be cheaper than a new school may not prove valid.

When Additions Are Unjustified

As a general rule it may be said that additions to relatively new schools which require major changes in the existing plant to accomplish an effective and unified expansion cannot be justified. If it is necessary to undo work only lately completed, it is obviously bad economy. This is apt to be the case where the function of the existing plant is to be changed, as from secondary to elementary use. Another example would be an attempt to add pupil capacity to a school designed in all its core facilities only for the original number of classrooms.

A new school has a great advantage over an addition to an existing plant. Provisions for future growth can be built into it, whereas with an addition to an existing school it may be the end of the line in this respect.

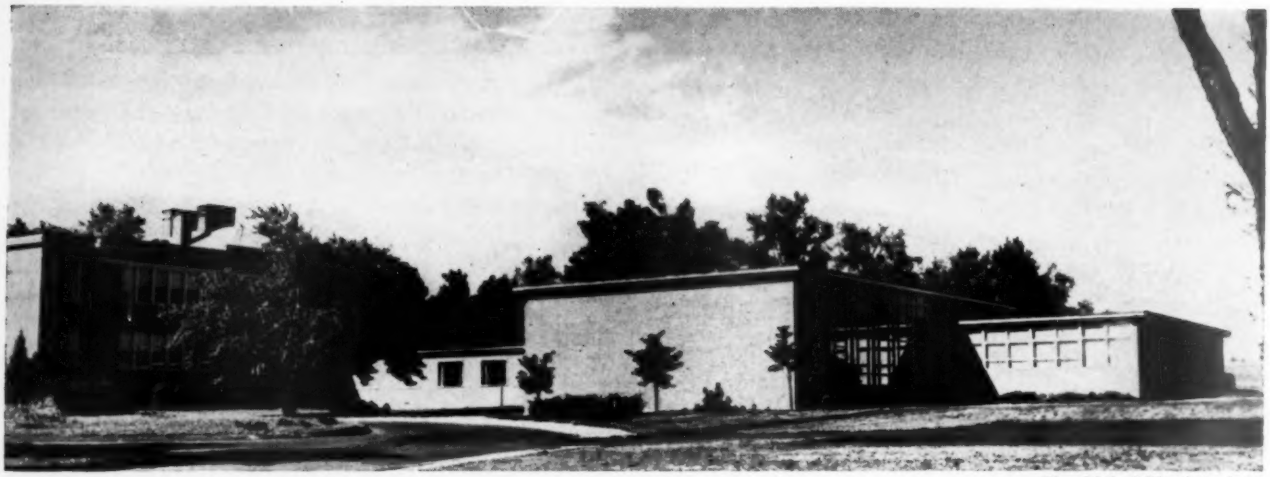
The Case for Additions

Where additions to older schools are proposed the economic advantage of such additions against new facilities should be scrutinized.

The case for additions may, of course, be very sound. We have occasionally found ourselves in the position of recommending additions in opposition to public and professional opinion. The obvious advantages of additions over new facilities are these:

1. An owned and developed site that may be well located.
2. A water supply and sewage disposal system.
3. Core facilities adequate for additional pupil capacity.
4. Mechanical plant that can be economically extended.

There may even be sentimental values attached to an old school and these cannot be dismissed lightly.



The Malmfeldt Associates

The Elm Hill Elementary School addition, Newington, Conn., was justified on economic grounds, with the original building being sound and easily adapted.

Often the area served by an old school is so completely developed that no open land is available for a new school site.

The Projects Involved

In general, projects involving additions fall into two categories: those adding to pupil capacity mainly by adding classrooms; and those which may add classrooms but which also involve the addition of core facilities to bring the old school up to standards established for newer schools. If the existing school is old, extensive remodeling will be indicated to bring it to the standard of the additions and to give the entire project a life expectancy that will justify the expenditures proposed.

It is the projects involving older buildings that are the borderline cases. These older buildings should be the subject of frank appraisal before being considered for additions.

There is at least one classic case of a proposed high school addition and remodeling project in which the bids exceeded the estimated cost of a new school with the same facilities. On the other hand, many old buildings are structurally sound, have been well maintained and provide suitable and often generous spaces for school activities. Let us analyze such a school and attempt to evaluate it as a subject for remodeling and extension, as opposed to replacement with a new school.

A Hypothetical Example

We will assume that the site of the old school is well located in relation to population served and is adequate in size or may be economically increased by acquiring adjacent land.

The chances are that the building is over thirty years old. It has brick bearing walls, with corridor and stairhall walls also of brick. The floors are plank or wood joist construction with a maple finish that has been maintained with oil. Desks are screwed to floors that have become grooved by scuffing feet.

The toilet rooms are in the basement next to rooms designed as play rooms, but converted in recent years to substandard classrooms. The stairways are open and of wood construction.

Conditions in the Old Building

The greatest evidence of the passing of time is the mechanical equipment of the building. The heating is by steam supplied to radiation at windows from boilers converted to oil. The control is therefore from a single thermostat that starts and stops the burner. Over and underheating are inevitable.

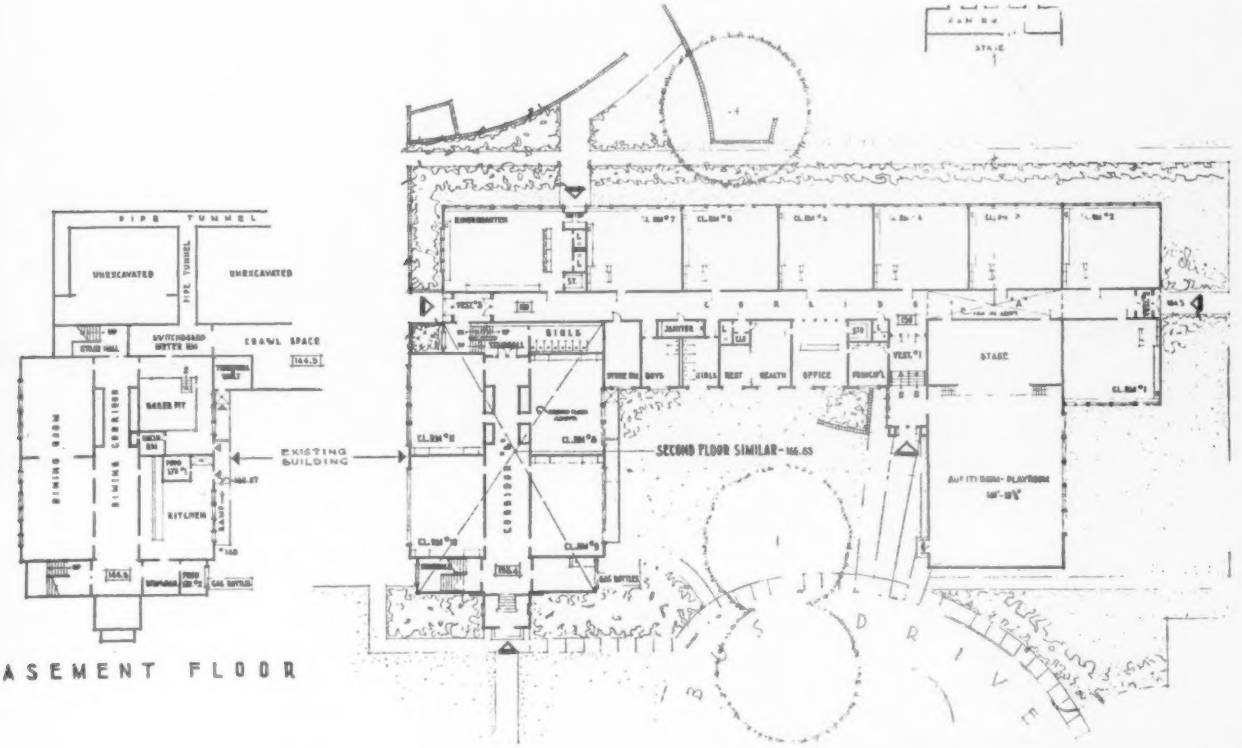
Ventilation is by gravity exhaust stacks of masonry that terminate in great chimneys in the slate roofs. There may be aspirating coils in these stacks to induce exhaust but they have developed leaks and are shut off. In fact, the ducts have been closed because cold drafts have plagued the teachers.

In recent years the iron pipe for water supply has required yearly patching and now must be completely replaced. The fixtures are crazed and antiquated. A few fluorescent lights have replaced the low wattage incandescent fixtures, but wiring is inadequate for a proper installation and service to the building is undersized.

The classrooms have plaster walls and ceilings in good condition. There is an excessive amount of slate board and not enough tackboard. There are coat rooms between classrooms which are adequate and storage cupboards are recessed into classroom walls. The trim is rather battered, roller shades are torn and dirty and the rooms cannot be darkened for the use of projectors.

What Is Proposed

This is the school as we find it. It is proposed to add four classrooms and a kindergarten and supplemental facilities to provide a modern educational program. This will require an all-purpose room, a hot lunch program and administrative, health and teachers rooms.



Floor plan of the old and new sections of the Elm Hill Elementary School. The original building is at left and has a basement and two floors. The addition is one story and consists of a kindergarten, seven classrooms, auditorium-playroom and administrative areas.

Alterations to the present building should bring remodeled facilities to a standard approaching new facilities, as the project must be designed for a life expectancy of fifty years.

Preliminary planning indicates that a single floor addition can tie into one stair hall of the old building to provide the four classrooms, kindergarten, all-purpose room with stage, administrative, health and teachers rooms. This wing will require 12,000 square feet of new construction.

Basement Becomes Kitchen

The basement of the old building provides adequate area for a kitchen, a cafeteria which can double as a library, the boiler plant, janitor's work room, etc. The present chimney is too small for the new heating plant, which must now heat the enlarged plant; so a new chimney is to be built. The old chimney will serve a new incinerator. A ramped areaway is built to provide access to the new kitchen and boiler room. The boiler room is fireproofed. On the upper two floors new toilet rooms are provided where the old office and teachers rooms had been.

Many Alterations Are Planned

Alterations are extensive. The plumbing and heating is entirely replaced except for the reuse of some cast iron waste and vent lines and the cast iron radiation. The electrical work is also a practical replacement. Positive ventilation of classrooms is provided by installing fans in the attic to draw air through the masonry ducts and discharge it into the chimney-like stacks.

Floors Are Leveled

In the basement concrete floors are leveled and asphalt tile is laid. On upper floors the old desks are removed, floors are leveled with underlayment or plywood and new asphalt tile is laid. If the wood floors are not too badly grooved they can be sanded smooth and refinished. New acoustic tile ceilings are installed throughout the building by cementing tiles to the plaster.

Some of the slate panels are removed and cork panels are substituted. A considerable amount of new trim is installed. Venetian blinds, dark-out type, replace the roller shades. Counters and some sinks are installed in all classrooms. With skillful painting the rooms take on a different look and compare reasonably with the new rooms.

The open wood stairs are a violation of fire codes and are replaced with steel stairs and masonry treads. The stairways are enclosed at the two lowest floor levels with metal and wire glass smoke screens.

The kitchen is new in all its finishes and fully equipped. The limitations of working within the old basement area, however, are noted and the plan is not

ideal. Pipes cannot be concealed and the ceilings are too low. Despite this, a practical and functional kitchen-cafeteria results.

Cost of the Transformation

Thus the old school emerges almost as new and shining as the new additions. But let us look at the cost of this transformation.

The old building contains 16,000 square feet. As the mechanical work is virtually replaced, its cost at today's prices is that of new work or approximately $4.40 per square foot of building. New ceilings add $.25, and floor finishes $.35. Totaling the cost of the many alterations, such as the stairs and enclosures, the incinerator and chimney, the new tiled toilet rooms, the replaced trim, the painting and venetian blinds, means that another $3.00 per square foot is added.

The alteration cost, then, amounts to $8.00 per square foot for the 16,000 square feet in the old building. For the 12,000 square feet of new construction the cost is $15.00 per square foot. We must now appraise this cost against the cost of a new school with equal facilities.

Comparing the Costs

A new school with a more efficient plan can provide equal facilities within a smaller envelope, and we find a satisfactory plan that contains 25,000 square feet. Using the same unit cost of $15.00 per square foot, the new school (building alone) will cost $375,000.00 and the remodeled school $308,000.00. We have not considered the cost of equipment and fees, which should be about equal for either project, or for site improvements which should be more for the new school.

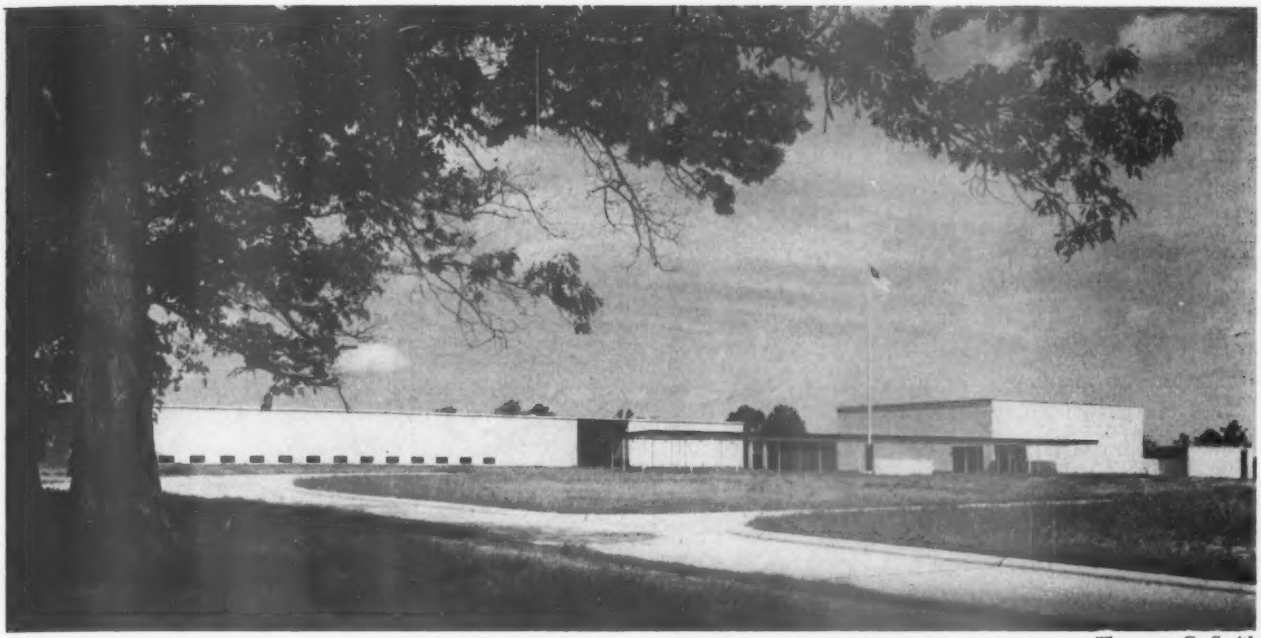
Conditions May Not Be Favorable

At this point the case for the addition and remodeling appears to be won, but the differential of $67,000 is not great. It could be greatly reduced or erased if the following conditions, favorable to remodeling, did not obtain in our hypothetical example:

1. The building was sound and well maintained. Roof, walls, windows, gutters, hardware, interior plaster required no renovation.
2. The site permitted freedom in planning the addition so it could be added efficiently and economically.
3. It was possible to use the old building without changing its basic room layout. If the problem were complicated by conversion of high school facilities to elementary or vice versa, or if major structural or partition changes were involved, costs could skyrocket.
4. The site was adequate for the addition. This is a happy situation that rarely exists. The old school is apt to be built upon a postage stamp site surrounded by developed properties only obtainable at high cost and through condemnation.

Cost Appraisal Is Necessary

The purpose here is not to discourage renovations and additions. Indeed such projects should be encouraged when they result in improvement of present facilities. The approach to such a project should, however, be realistic. A thorough appraisal against the cost of a new school plant appears to give the most direct answers to the challenging question of whether or not to plan a school addition.



Combination auditorium cafeteria is at left, the gym and shop at right.

Thurman C. Smith

PLANNING A COMBINATION RURAL SCHOOL BUILDING

by ROSCOE H. WHITE

Superintendent, Caddo Parish School Board, Shreveport, Louisiana

Mr. White holds B.A. and M.A. degrees from the University of Colorado and has done graduate work at the University of Texas and Teachers College, Columbia University. He served as a rural teacher and principal in Texas and as a district superintendent in Nebraska and Colorado. Mr. White came to Caddo Parish (a county unit system) as assistant superintendent in 1935 and was elected superintendent in 1943.

WALNUT Hill High School, located in a strictly rural area some twelve miles southwest of the city of Shreveport in Caddo Parish, Louisiana, was built at a cost of $1,160,000. The school provides a twelve grade program of education for an estimated 1,350 children. It includes facilities in a finger-style structure made up of seven different buildings, joined together by open corridors, for a program of education in the elementary grades, junior high school and senior high school. The school is a self-contained unit on an 80-acre site which has its own water system, along with all other necessary services.

The school is a phase of a major consolidation program carried on by the Caddo Parish School Board in one planning operation. Seventy-four small rural schools have been closed in this consolidation and have been combined into six large schools, three of which are twelve grade combination schools; the other three are six grade elementary schools.

Five thousand children in the rural area have been involved in this consolidation, with approximately 95 percent of them being transported to school in 70 school buses. The capital outlay expenditures involved in the consolidation program have been a little in excess of $5,000,000. Planning problems, and solutions to them, found in the Walnut Hill High School were also found in the other two combination schools. These two schools were planned for about the same number of children.

Teachers and Parents Help Plan

Even though teachers in the former small rural schools had not had any working experience in large schools, they were brought into the planning sessions

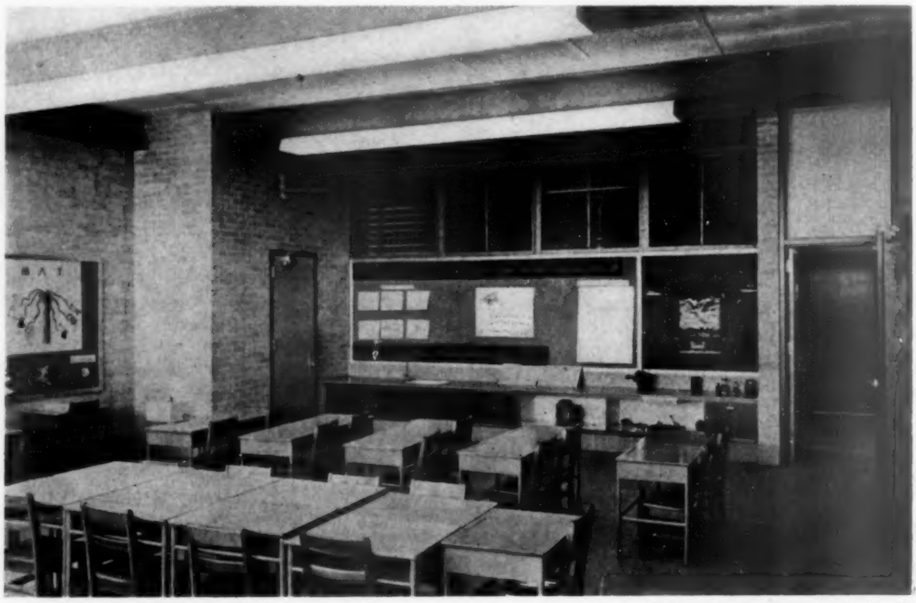
for the new building in the consolidation program. A committee of parents was also brought into the planning discussions. The central office found teachers and parents helpful in many respects in determining what should be taught, particularly in the junior and senior high school divisions, and in making suggestions for facilities that needed to be provided in the buildings. These planning sessions were useful because they gave both teachers and parents an insight into the needs of the improved program of education that would result from consolidating the small rural schools that had existed for so many years.

The greater portion of the 80-acre site of the Walnut Hill High School will be used for the program of instruction in agriculture and animal husbandry. High school students will be taught how to operate motorized farm machinery and will be given actual practice in its operation. A food preservation unit is being constructed at the school as an integral part of the agriculture and home economics program of education.

Planning Session Surveys

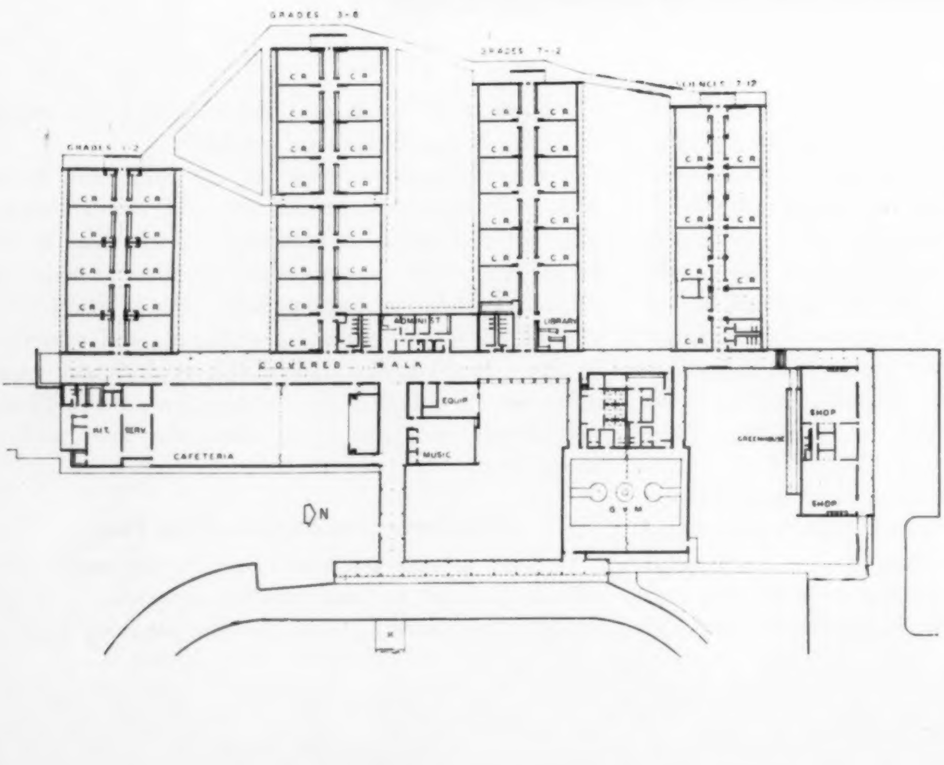
Among the surveys conducted in the planning sessions was one to determine the kinds of occupations which high school graduates might most likely follow after leaving school. While the school itself is in a rural area, it was learned that many of the parents did not follow either agriculture or animal husbandry as occupations.

Family heads, in many of the families in the area, were found to be working in a number of dif-

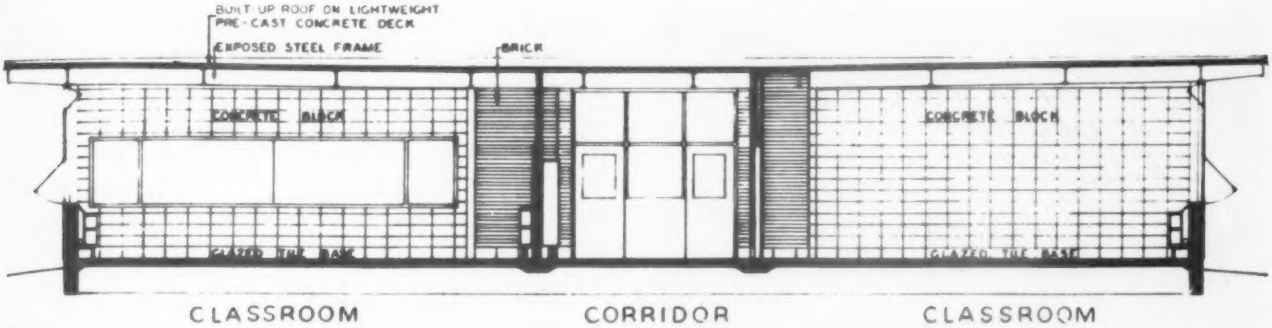


One of the 25 classrooms for grades one to six, showing some of the movable furniture and other equipment used in the school. Each classroom for grades one and two has lavatory facilities for the children. Community toilets are provided for all children in grades three and above.

Photos by Thurman C. Smith



Walnut Hill Consolidated School for grades one through twelve has a capacity of 1,360. William B. Wiener and Associates are the architects. Mr. Wiener has been a practicing architect since 1934.



Typical section through classrooms of the Walnut Hill Consolidated School. Concrete block walls have glazed tile bases. The built-up roof is on a lightweight precast concrete deck.

ferent types of occupations in the city of Shreveport. This came to be an important factor in planning the program of studies for the junior and senior high school. It was also learned that this type of family had some interest either in dairying or in farming a small plot of ground.

Prior to the opening of the new school in September, 1956, the people in the area being serviced by the school did not have a community meeting place where they could come together as a center of interest. A main objective from the early stages of planning has been to make this a community-centered school. The building itself and the program of education being developed in it, place emphasis on the school as a community center.

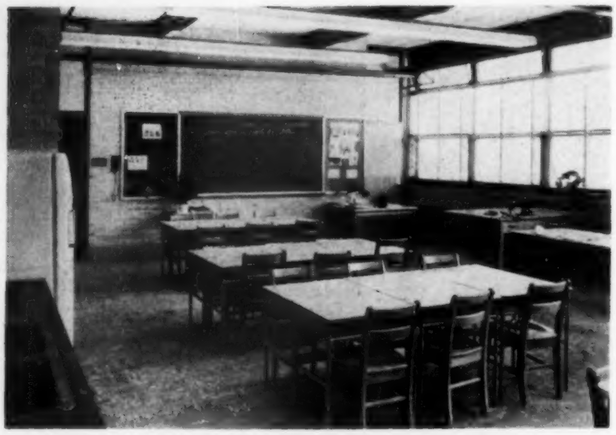
The administrative area (above) has a public reception room, principal's office, counselor's office, teachers' lounge and work spaces. Science room (below) will accommodate the teaching of any or all sciences.

Areas Within the School

The physical plant at the Walnut Hill High School includes forty-three classrooms, a library, shops, a gymnasium, music rooms, cafeteria and administrative offices. The area immediately around the building includes concrete service roads and concrete parking areas. Designed by architect William B. Wiener, the school is a completely self-contained unit with its own water supply and disposal system. In working out the plan for the building, a finger-style design with four separate units for classrooms was determined to be the best means of separating children by grade groups.

It was felt that the small children in the elementary grades should be separated as much as possible

Shop area has been designed for children from grade seven through twelve. Use of equipment, such as shown below, is limited to students in upper grades.



Home economics department provides instruction for grades 7 to 12. There are facilities for home living—sewing, dressmaking, meal preparation and child care. (above)

Spacious gymnasium can be divided into two smaller gyms by folding doors operated by an electric motor. Locker and shower areas for boys and girls adjoin the area.

from older children in the junior and senior high school grades. Certain common facilities such as the cafeteria, the music department, gymnasium and shops were located in logical relationship according to their use by students and the traffic pattern involved. The administrative area was located centrally so that it would be convenient to all parts of the school.

In planning the Walnut Hill High School, it was resolved to make the building sufficiently flexible to permit adjustment to any future changes in the educational program. It was also necessary to plan the building so that its cost would come within the limits of an established budget of $650.00, per elementary child, and $900.00, per junior and senior high school child. This budget had to cover all costs for constructing and equipping the building.

Breaking Down the Costs

The costs involved in site purchasing and site development were not included in the budget set up for the building itself. When completed, the building contained 82,755 square feet, and the construction cost was $10.25 per square foot. The construction cost, per pupil, including all areas of the building, averaged $624.00. The above cost figures do not include cost of the site, cost of site work or equipment.

Four Classroom Wings

The completed Walnut Hill High School, designed by architect William B. Wiener, contains four classroom wings. The first wing is for grades one and two; the next wing accommodates grades three to six; and the third and fourth wings house grades seven to twelve, with the library being in wing three. A concrete driveway is at the front entrance to the building where there is a covered area for unloading from buses the 1,300 children who attend the school.

The front part of the school contains the combination cafeteria-auditorium, music facilities, gymnasium and shop-greenhouse building. All seven separate buildings in the structure are connected by covered arcades. The structural system for all buildings in the school is basically an exposed steel frame enclosed with masonry and glass.

Precast rough tile provides a finished ceiling surface throughout, except for suspended acoustical ceilings in the kitchen and administrative areas. The structural system provides a permanent (fire resistant) type of building. The roof is of built-up material laid on a lightweight, precast concrete deck.

ADAPTING JUNIOR HIGH SCHOOL PLANNING TO A SUBURBAN COMMUNITY

by WILLIAM E. KELLER

Supervising Principal, Williamsville Central School District, Williamsville, New York

Dr. Keller holds a B.S. degree from East Stroudsburg State Teachers College, and an M.A. and Ed.D. from Columbia University. He served with the U.S. Air Force for 4 years, later becoming director of elementary education, Orlando, Fla. After service with the N.Y. State Education Department and as assistant superintendent in Westport, Conn., Dr. Keller accepted his present position.

THE rush of home dwellers to the suburbs is only at the beginning stage. A period of sensational growth lies ahead for many suburban areas of the country, and some will double in size within the next twenty years. This estimate of expected expansion is drawn from a survey of large cities recently completed by the Economic Unit of *U.S. News and World Report*.

The Census Bureau projects a population increase of 63.3 million people from 1955 to 1975, assuming that birth rates continue at the present high level. Of this increase more than 50 percent will find homes in the suburbs. By 1975, urban residents are expected to make up nearly three-fourths of our total population.

In the period ahead not only are the present suburbs expected to expand, but new ones are likely to come into being. Besides a need for housing, this also means a demand for entirely new sewer and water systems, networks of utilities, school systems, churches, parks and playgrounds, stores and service stations, hospitals and office buildings.

The arrival of new residents in a community emphasizes the need for integration of old and new populations, of old residents and "commuters." The movement of new families into well established communities sometimes arouses conflicts of interests. Wide difference in nationality and cultural patterns, education and occupation makes planning for community services difficult.

It is within such a framework of growth and expansion that our junior high schools of the future must be planned.

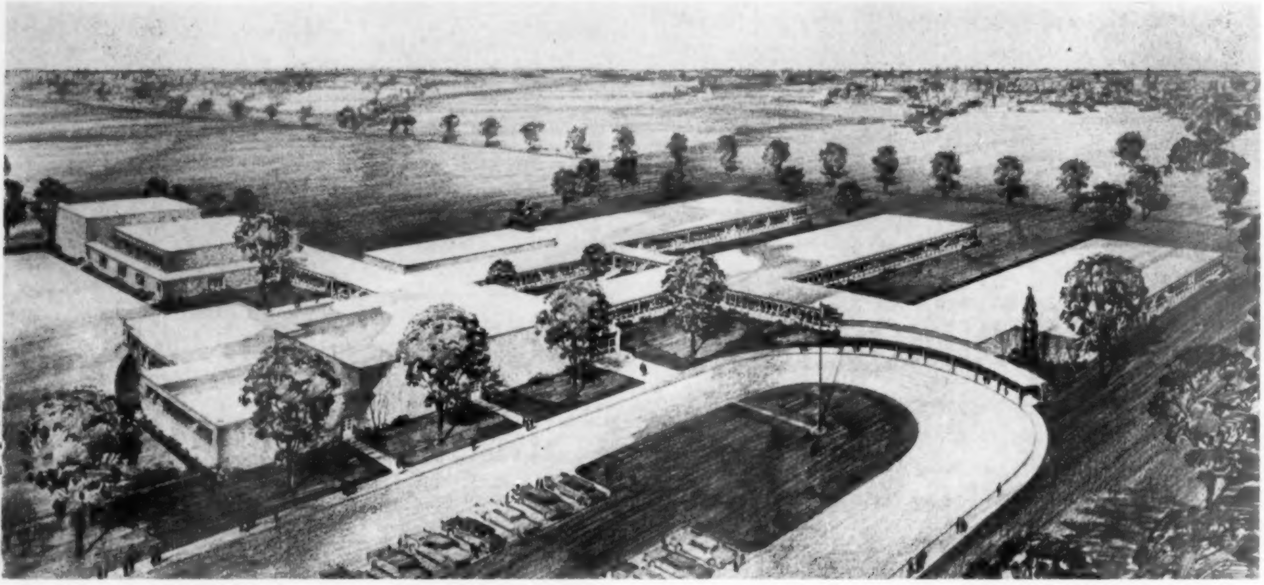
A Bond Issue Fails

Let us review a recent series of events which followed an unsuccessful bond issue referendum to finance a new junior high school for Williamsville, New York. The scene of these events is a rapidly growing suburban community near Buffalo. Some of the issues involved are common to any school district facing similar population expansion.

The Williamsville Central School District was organized July 1, 1948. It is located about seven miles northeast of the city of Buffalo and contains an area of approximately forty square miles. The Village of Williamsville, entirely within the district, has a population of about 5,000 and is a progressive community with all modern facilities.

The district is primarily residential in character and contains many fine, individually owned homes. It is considered one of the most desirable residential areas suburban to Buffalo. Most of the residents are employed in the city of Buffalo and the Niagara frontier region. During 1956 approximately 500 building permits were issued for new homes within the school district.

In March, 1957, the community voted two to one *against* a bond issue for the construction of a 1200-pupil junior high school. Since this time the board has been



Hare Photographs Inc.

East wings of the Williamsville Junior High School contain the "little schools." The community facilities, gymnasium, cafeteria, auditorium and swimming pool are located in the left portion of the view shown above. Architects are Duane Lyman and Associates.

working with a citizens advisory group of 100 persons. It is their combined effort to clarify the questions and doubts raised during the campaign, prior to the initial vote.

Questions Were Raised

Some of the questions being aired by the Williamsville citizens group reflect many issues which might well be raised in other suburban communities as they attempt to adapt junior high school planning to their own local situations. Among the issues raised by the people were the following:

1. Why do we need junior high schools?
2. When will we need the next school building?
3. What effect will the proposed Catholic high school have on enrollment?
4. What is the objection to having all junior and senior high school students in one center?
5. Does the "school within a school" plan involve special costly construction?
6. Why build "country clubs" instead of schools?
7. Why build a "high cost" one floor plan?
8. Why "exceed" state minimum educational space requirements?
9. Why include homemaking and industrial arts in junior high school?
10. Why does the building have to include "patios" etc.?
11. Why not add onto the present junior-senior high school?
12. Why do we need a swimming pool?
13. Why "all-over-the-lot" construction instead of compact construction?
14. Why not combine auditorium and cafeteria?
15. Why a 20-acre site?
16. What are state requirements for site?
17. How much per year is saved by locating the school near the center of school population?
18. How will an increased tax rate affect the average taxpayer?
19. If our taxes keep rising how will we keep roofs over our heads?
20. Can the community afford such schools?
21. How many more schools will we need in the next 10 years?
22. Why do we not seek or wait for federal aid?
23. What will happen if we do not build this junior high school?
24. Are modern education programs detrimental to scholastic ability?
25. Are we over-emphasizing physical education?
26. Are double sessions harmful?

Some of these questions reflect an obvious lack of understanding of the purposes of a junior high school. Such schools were pioneered in the early 1900's. However, in some suburban communities a junior high, per se, is a "strange animal." It is a first, an unknown or unfamiliar institution to the citizens. Most growing suburban communities provide educational facilities for their children in the form of one or two elementary schools, followed by a junior-senior high school. Then, after a period of expansion, the need for more classroom space at the high school develops and a junior high school is usually proposed.

What the People Wanted

Citizens, who do not understand the educational

reasons for constructing facilities for junior and senior high school students, are apt to advocate, for economy purposes, the addition of a new wing on the existing high school. That is what happened in Williamsville. Also, there were those who did not see the need for homemaking and industrial arts for the students.

The swimming pool was regarded as a needless luxury, as part of a "country club school" and not part of the educational and recreational facilities so necessary for young people in a suburban town. The whole area, incidentally, leans quite heavily on the board of education to help plan community recreational facilities.

Thus, in planning a junior high school, serious consideration should be given to how well the community understands the needs and purposes of the total educational program.

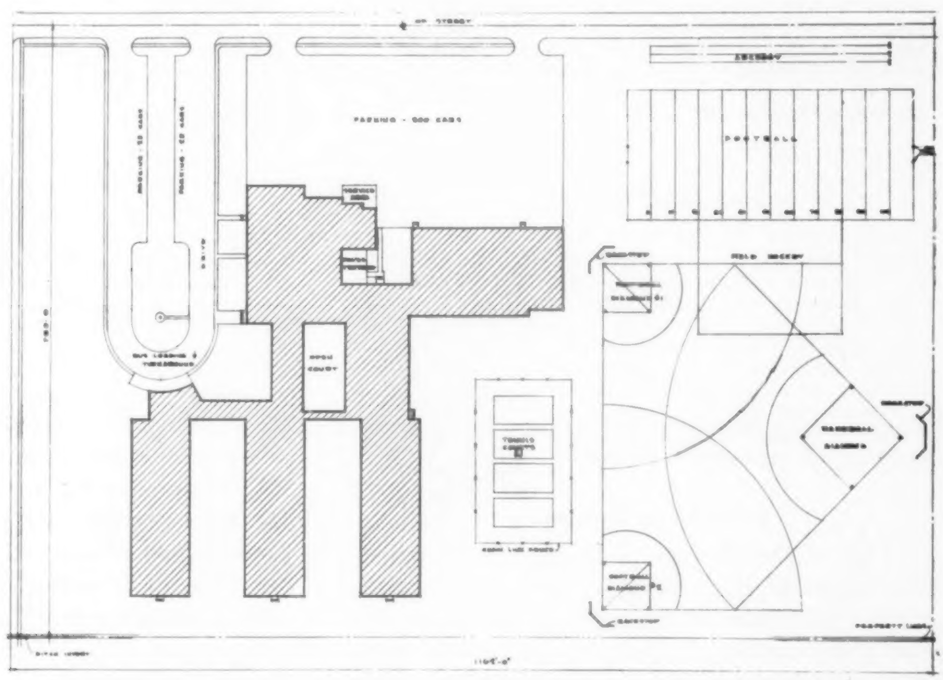
Translating Program Into Building

The Williamsville Board of Education also had the task of trying to translate educational program needs and purposes into a functional building. Here, the board faced the challenge of demonstrating the advantages of the design of the school would exploit the educational advantages of both a small and a large school, with the constructional and financial economies of a large school.

In a small junior high school of 300 to 500 children, the child makes an easier transition from elementary to junior high school; there is a greater emphasis on the individual child; there is a closely knit group of teachers working together who have greater freedom to enrich the curriculum for their students. A large school, 1000–1200 population, offers more economy in construction costs, more flexibility in programming and a greater variety of specialized facilities and personnel. To create a series of small schools within one large school has been the challenge to the planners.

Educating the People

The essence of the Williamsville problem seemed to be a matter of changing preconceived attitudes of the people; to condition the community to accept planning for the future; and to change the stereotyped ideas people have about school buildings and planning for new school construction.



Site plan of the proposed junior high school for Williamsville, New York. There are parking provisions for over 300 cars. Playfields include tennis courts, archery, football, field hockey, baseball and softball fields.

a functional one story, "sprawled all over the lot" construction over a compact, two story building like the present high school.

The board attempted to prove that a one story structure provided a flexible arrangement of spaces, industrial arts, homemaking, art, etc., which would foster a team approach among the teachers. Also, they pointed out that there are certain facilities, used by the community, which are more effectively controlled if isolated from the remainder of the school, such as the swimming pool, auditorium, gymnasium and cafeteria.

Furthermore, every effort was made to show how

Discussion of the proposed bond issue for the junior high school smoked out issues which might be grouped under a "planning" category. Like many rapidly growing suburban school districts, the Williamsville district needs to adopt a master plan for its future development. Thus far there has been little joint planning among the affected town governmental groups which serve the district.

There is no long-range pattern for the purchase of future school sites. As a result, the board has little opportunity to select the appropriate location for a site, and has been practically at the mercy of the owner

when talking purchase price. Furthermore, the population influx has outgrown present water and sewage facilities and the location of the school is determined by these services rather than by the distribution of the children.

The board of education has also been asked by the voters to offer some projection on the number of new schools needed in the immediate future, and how these demands reconcile themselves with the financial ability of the school district. Here again is the dilemma which faces many a suburban area. Can the district afford to be a completely residential area or should it depend on light industrial development to carry the burden of future school taxation?

Conflicting Authority

Most of the planning problems arise because the suburban school district is only a segment of a suburban or metropolitan area. There may be overlapping government groups such as village, town and country boards. These overlapping bodies make it difficult to achieve the integrated planning necessary for efficient educational and financial development of a school district.

Problems related to sewage, water and zoning color future development, but the school district has little control over them. In some cases, the population growth of the suburban school district has exceeded the provision for necessary community services. Consequently, excessive wastes are incurred. Then rising school costs and taxes are apt to become the whipping boys for lack of municipal planning and overall community development which would result in a more economical expenditure of funds for schools.

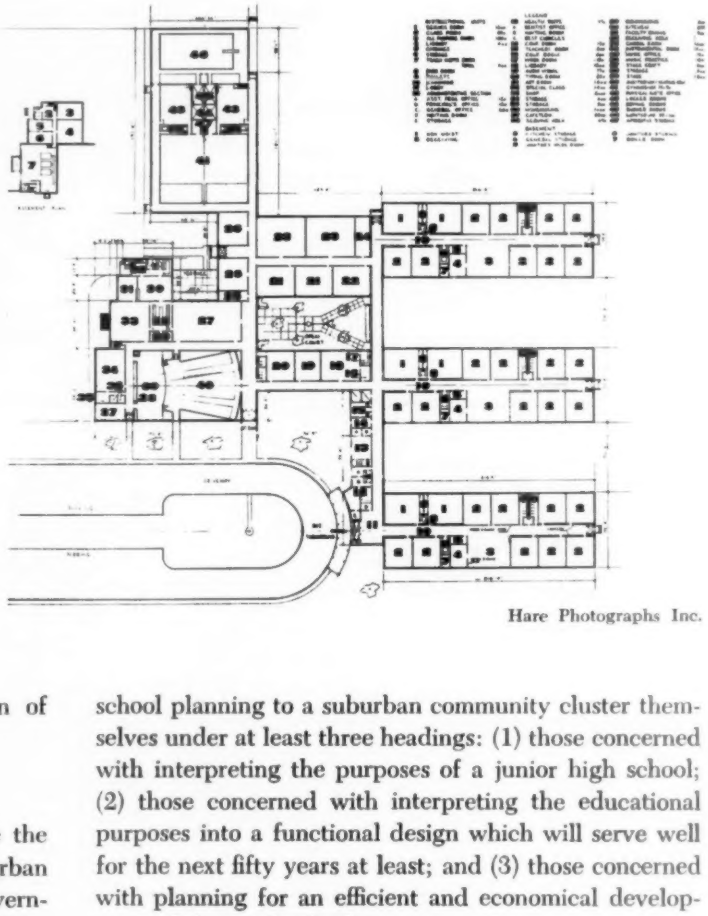
A tremendous increase is now taking place and will continue to take place in elementary and secondary school enrollments. Community after community is engaged in an extensive school building program to meet this increase. Because of its position between the elementary and the high school, the junior high school frequently provides a ready solution to the pressure of increased enrollments. When new buildings are being constructed it is an appropriate time, in some communities, to introduce the junior high school plan of organization.

The problems involved in introducing junior high school planning to a suburban community cluster themselves under at least three headings: (1) those concerned with interpreting the purposes of a junior high school; (2) those concerned with interpreting the educational purposes into a functional design which will serve well for the next fifty years at least; and (3) those concerned with planning for an efficient and economical development of the total suburban community.

Success Is Possible

The experiences of one community have been presented to illustrate these difficulties. It is hoped that the suburban school districts which try to adapt a junior high school program to their educational needs will meet with a successful acceptance of their aims. Citizens groups are invaluable aids in gaining the community's approval of school building programs and plans.

In September, 1957, the people of Williamsville passed the bond issue for their new junior high school. Credit for this should be given to the citizen groups who helped to bring it about.



Circular drive provides a bus turnaround. Classrooms are easily reached from the main entrance of the school. Three wings at right house the classrooms, all-purpose rooms, library units and special areas. At upper left are the natatorium, locker, shower and drying rooms and gymnasium. Central area of the floor plan houses the shops, art rooms, homemaking, cafeteria, faculty dining room, kitchen, typing, audio-visual and work rooms. At lower left are the auditorium (seating 450), stage craft and music instruction rooms. Administrative areas are located on the plan above the main entrance. Each classroom wing is designed to house 300 7th, 8th and 9th grade pupils. Library and guidance facilities are included in each little school.

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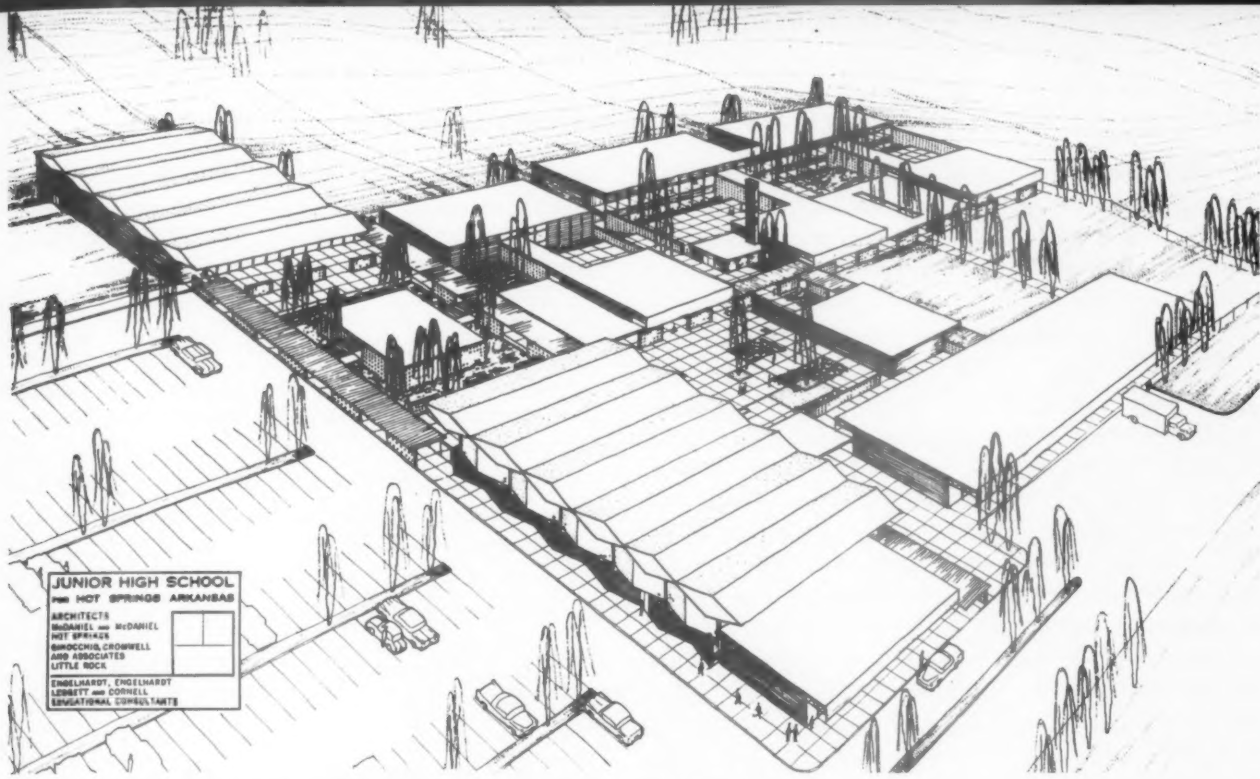


Designed by architects McDaniel and McDaniel of Hot Springs and Ginocchio, Cromwell and Associates of Little Rock, the new junior high school for Hot Springs, Ark., will house an improved educational program for junior high school students.

NEW JUNIOR HIGH SCHOOL CONCEPT—NEW BUILDING

by FRANCIS G. CORNELL

Engelhardt, Engelhardt, Leggett and Cornell, Educational Consultants, New York City

Dr. Cornell completed his undergraduate work at Columbia University where he also received his Ph.D. degree. In addition to teaching and administrative work he has directed research in a number of organizations. Before his present position he was director, Bureau of Research and Service, College of Education, University of Illinois.

and IMON E. BRUCE

Superintendent of Schools, Hot Springs, Arkansas

Dr. Bruce has an A.B. degree from Henderson State Teachers College, an M.S. from Louisiana State University and an Ed.D. from Indiana University. He served twelve years as superintendent of schools at Fordyce, Arkansas, and since 1953 has been at Hot Springs. He has taught summer courses in School Administration and Finance at Indiana University and the University of Arkansas.

SEVERAL impelling objectives, often in conflict with one another, are involved in the planning of a new school building for a community. Rapidly expanding enrollments and obsolescence of existing facilities may lead to hasty decisions and solutions which are expedient but not fully planned. Basically, planning involves looking far into the future.

Educational facilities under construction today should properly anticipate the educational programs which they will house twenty years or so hence. In spite of the pressure of time, however, agreement among large numbers of people must be achieved before positive steps can be taken. Today we can seldom proceed on the basis of a "crash program" planned by a closed circle of the superintendent of schools or his business manager, architects and perhaps a board committee.

Citizens participate, today, in decisions concerning public education. They are prompted by local, state and national programs urging interest in school problems and by the natural concern of the taxpayer faced with ever larger demands upon his income. When confronted with urgent needs it is not easy to do the right kind of planning—planning which genuinely anticipates educational requirements in the future and which permits the communication and interaction of many persons in a community.

This is a report of a project which apparently has satisfactorily met the pressures of time and, at the same time, has produced a scheme for a junior high school in the community of Hot Springs, Arkansas, which lays

the groundwork, not only for advancing the concept of the junior high school in that community, but for setting a pattern in the state for junior high school education and the facility to support it.

Situation: Critical

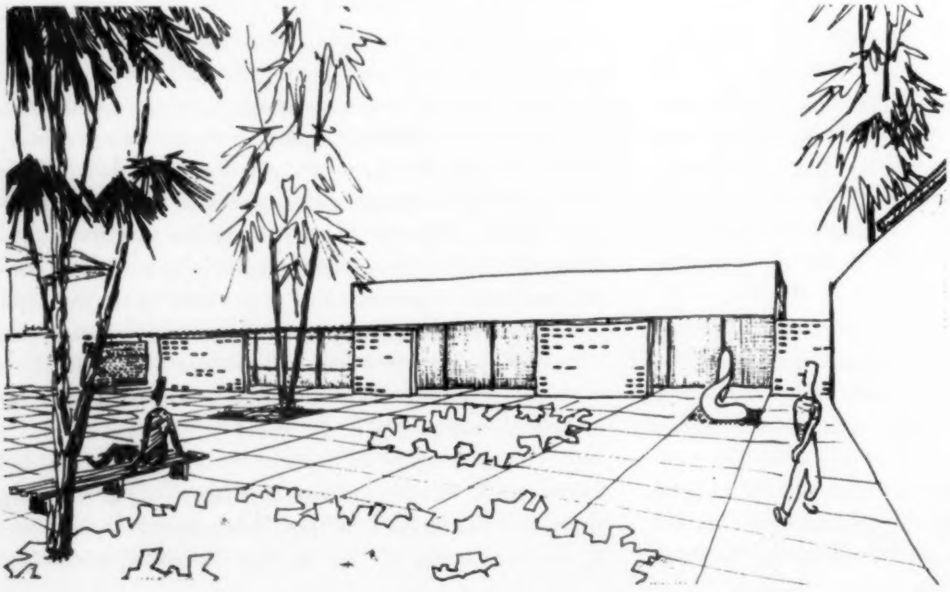
By the spring of 1957 the housing problem for junior high school students in Hot Springs was so critical that no time could be lost in constructing a new building. The fall of 1958 was set as a target date at which time it was hoped that the new plant would be usable. The old junior high school plant did not permit the operation of a satisfactory educational program. Constructed in 1925, it adjoined the senior high school building and was located on the same three acre site. An extremely regimented condition prevailed, caused by the sharing of the cafeteria, auditorium and fieldhouse. The old building, designed to accommodate 750 students as a maximum, was being used for over 1,200 junior high school pupils.

From this undesirable situation developed the view that junior high school instruction in Hot Springs did not satisfy the needs of students and failed to meet the concepts of junior high school education. With overcrowded conditions and the influence of the senior high program, the junior high had become an institution more like a senior high school and less like one designed to prepare youth in early adolescence for the transition from elementary instruction to the less dependent activities of higher level education.

Community Recognition of Need

Progress in developing the new junior high school structure came about as a result of the community's involvement in the specific planning operations. A community-wide study served to keep the public informed of activities. It helped form outlooks on educational need which led to improved plans and the achievement of economies made essential by growing needs. Steps in this program of community preparation include the following:

1. A school district conference held in January, 1956, planned by a committee of sixty citizens. The committee was divided into three subcommittees dealing with curriculum, buildings and finance.
2. Reports of the committee studies were presented to a meeting of approximately 650 citizens. This meeting was organized in a manner which permitted participation of everyone in small groups.
3. The creation of a citizens committee named by the board of education to work with the superintendent of schools in studying suitable sites for the new school.
4. The purchase of a site for the new junior high school by the board of education.
5. An immediate decision to give priority to increasing teachers' salaries at the school election in 1956, but to include a bond issue to finance a new junior high school in the next election.
6. A program of informing the public of the overcrowded conditions at the junior high school level and the general critical need for a new building.
7. The distribution of a questionnaire by the superintendent of schools to all parents and members of civic groups as a basis for another community conference on schools. This questionnaire was summarized and observations of visiting administrators were made at a community meeting in December, 1956.
8. Formation of a citizens building committee, made up of nine subcommittees for administration and such subject matter areas as art, English, social studies and the like.



Separate buildings are grouped about outdoor courts. Screen walls are interspersed throughout the outdoor areas.

9. The voting by a substantial majority of the community in March, 1957, at the annual school election, for an increase in tax rate to finance a new junior high school.
10. The engaging of an educational consultant to work with the committee, the board of education and the staff of the schools.

Although specific thinking about the features of a structure did not begin until after March of 1957 (the architects had not yet been employed at that time), it was hoped to have a building ready for occupancy by the fall of 1958.

Steps in Planning the Building

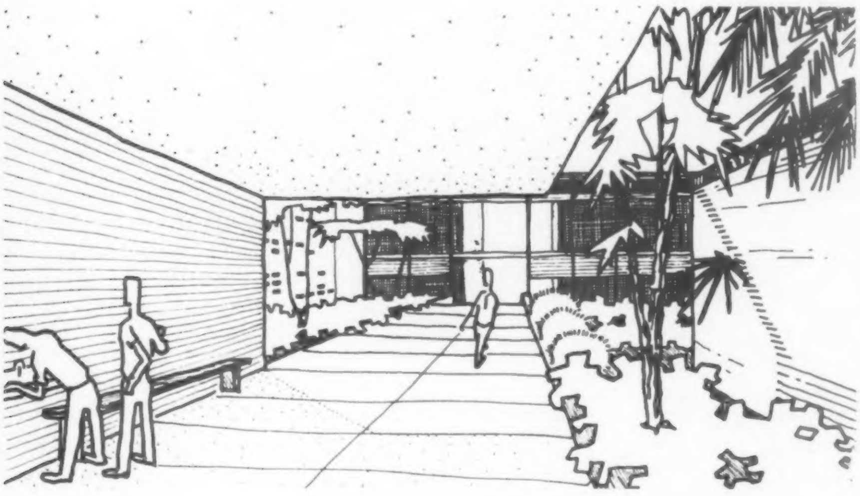
The background community preparation had much to do with the rapid progress made after the educational consultant appeared on the scene. The consultant helped the board select an architect and aided existing committees to summarize building needs in their respective areas. From reports prepared by subcommittees, a workbook for study was prepared by the consultant as a basis for planning the new junior high school. This workbook contained extensive requirements for the structure, including a discussion of spaces needed, a space budget, and also an expression of a philosophy for the school.

The architects, McDaniel and McDaniel of Hot Springs and Ginocchio, Cromwell and Associates of Little Rock, board members and committee members met in conferences to make revisions of the workbook. The architects were present at these sessions when the thinking of members of the community and the educational staff were coordinated. They were then able to proceed with preliminary sketches and the preparation of final drawings for approval. On November 26, 1957, bids were opened.

While the plans were being developed there was continued interaction among committee members, specialists in the state department of education, the architects, the consultants and the board of education. The channel of communications established in the preparatory phases of the program contributed markedly to expedite the contribution of all persons concerned in the project.

The Junior High School Concept

Guides for planning were found in the agreed-upon concept of what a junior high school should strive to accomplish. The general aims of the program to be housed in the new school were to be the following: to assist pupils in making a satisfactory transition from the educational experiences provided in the elementary school to those afforded in the senior high school; to offer a sufficient number of experiences to students so they will be prepared to choose areas of specialization upon entry into the senior high school; to consolidate the core of common learning young people should have before participating in the multiple-track programs of the senior high school; and to provide, through a guidance-oriented program of classroom instruction and a specialized program of guidance, opportunities for students to achieve educational, social and personal adjustments.



Judicious use of the site permits a spaciousness not ordinarily found in the cramped conditions of older school buildings.

The Resulting Plant

The basic classroom units of the new school are three "little schools," each to house one of the junior high school grades. Each little school has spaces planned to meet the special requirements of junior high school students. For instance, the provision of a multi-purpose room for each of the three grades, where informal activities may be carried on, will enable students to participate in different activities and give them an opportunity to acquire skills in getting along with others.

Also, the design of the little schools is such that students will be assigned to one teacher for several subjects or for a considerable block of the school day.

As each student has his basic subjects, he will be able to work closely with his own teacher. Opportunity will be provided for guidance as a means of effecting an easier transition from the elementary school to the senior high school program.

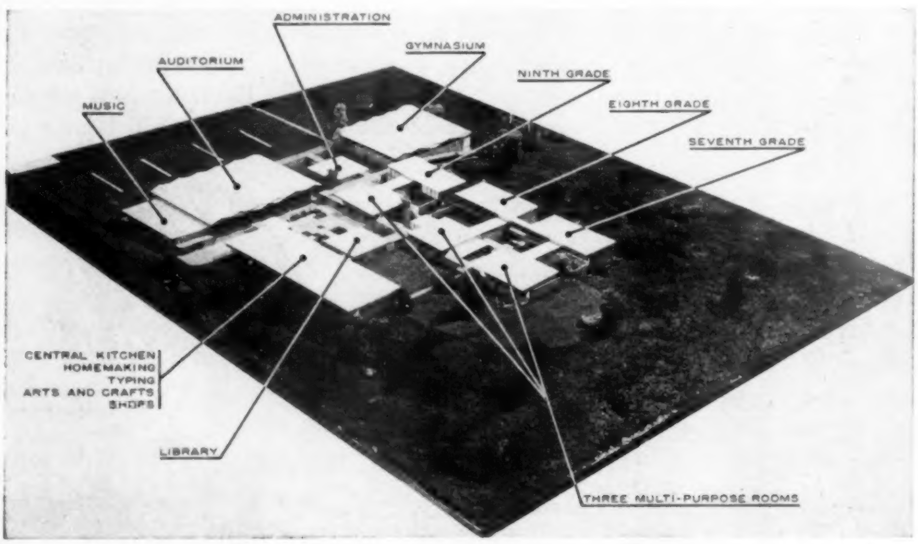
Part of the educational program to be carried on in the new building involves emphasis upon creative experiences in art, music and industrial arts so that students may develop skills and interests which will carry over into adult life. Hence, special facilities for such activities have been planned. The art room, auditorium with adjacent choral, ensemble and band rooms, and general shop will be shared by the three little school units. A library and homemaking laboratory are also designed to encourage students to explore a great many different fields.

A typing room will be included to add to the amount of flexible space available for a variety of educationally valuable activities. Personal typing and practice for students who may go on with commercial training in the senior high school will be part of the activity carried on in this room. Language arts, journalism and the school paper comprise additional activities to be provided for here. The gymnasium has been planned for all the physical activities so vital to the junior high school age group.

The architects' main purpose was to translate the educational philosophy into a structure which could, at reasonable cost, be accommodated to a site of irregular terrain. The spaciousness deemed desirable for a junior high school was achieved by maximum use of outdoor areas and covered walkways in lieu of interior spaces and corridors. The conditions of orientation dictated that the six classrooms in each little school be located on the downhill side of the campus in two story units, access being provided through terraced areas and covered walkways. The respective multi-purpose rooms were located a half-story level from the classroom units.

Multi-purpose areas were designed so that adequate food service could be provided from the central kitchen during the lunch hour. Economies were achieved by planning these multi-purpose areas to be quickly and easily adapted for many other functions. A feature of the structure is the success achieved in separation of spaces to avoid the undesirable congestion common in many large schools.

Structurally, the design is simple. Such recent engineering methods as the diamond truss roof have been incorporated. This particular method combines structural members for spanning parts of the building with roof materials as an economy measure. At the same time it adds aesthetic interest.

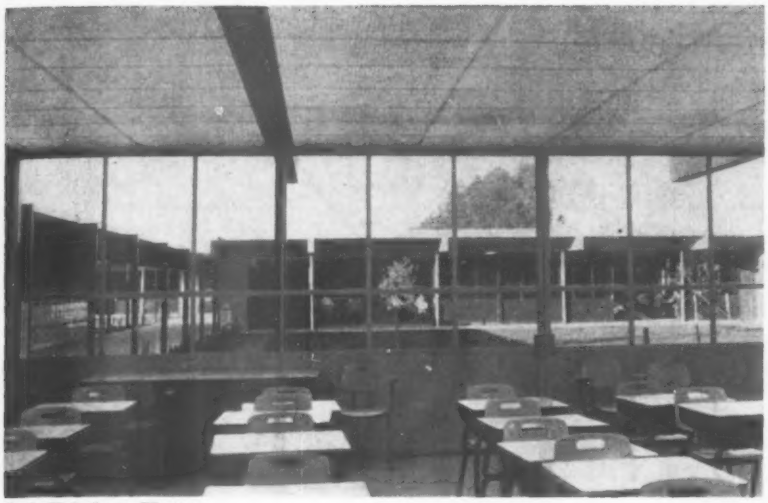


Seventh, eighth, and ninth grades are housed in separate buildings, each with a multi-purpose room. Music, auditorium, administration, gymnasium, library and homemaking-shops-central kitchen, are accommodated in other building units.

In summary, several major ideas have been expressed in the building. A junior high school should not be a small scale senior high school. Junior high schools have an exploratory function requiring abundant offerings which allow students to enjoy and explore many areas of activity.

Learning how to get along with others is an important early need of adolescents. Working, eating, playing and studying together should be permitted in the building. Junior high school youth need the opportunity of trying their wings. Spaces should be provided for opportunities for independent activity under the general guidance of the school. Space is needed to permit a program offering enough of the physical activities required by young people at their most active stage.

One feature of the junior high school concept is a need for finding and discovering the interests, needs, capacities and aptitudes of children preparing for senior high school. The building should permit a close and sympathetic system of guidance for all children.



Luminous ceiling is a feature of the Alamitos Intermediate School, Garden Grove, California. Architects are Neutra and Alexander. Small clusters of classroom buildings are grouped around landscaped patios. The result is a warm, home-like atmosphere.

Earl Holmberg Photos

CONTROLLED LIGHT FOR AN IMPROVED ENVIRONMENT

by BEVERLY E. JOHNSON

Miss Johnson graduated from the University of Southern California with a degree in Journalism. Following several years of newspaper reporting, she became a freelance writer, specializing in the subject of architecture. She has found school design to be an especially interesting and challenging phase of architecture, and has done extensive research into the effects of building design upon the minds and bodies of children.

THE complete story of classroom daylighting has yet to be told. While the sun does not stand still for children, architects or even kings, thousands of schools have been designed on the assumption that the natural light source is uniform. Hundreds of classroom "daylighting sections" have been prepared showing the foot-candle readings at desk height. These readings are usually represented as a single, simple curve across the classroom. Nothing could be farther from reality.

In an attempt to arrive at a true picture of classroom daylighting, a series of charts was prepared by architect Robert E. Alexander which indicate light intensities within classrooms of the Baldwin Hills School in Los Angeles. The charts were produced after an analysis of the precise effects of daily and seasonal sun movements on natural daylighting in the classroom. The study was conducted in cooperation with the teachers.

Every hour of the school day, for seven successive days during three seasons of the year, foot-candle readings were taken at fixed stations across the room. The charted findings reveal the variety of daylighting which may be expected of any single section of a classroom. The result is not a single curve, but rather a collection of curves.

These charts reflect only hourly and seasonal differences in a uniform climate. Cloudy and rainy days and extremes of latitude would create even greater variations.

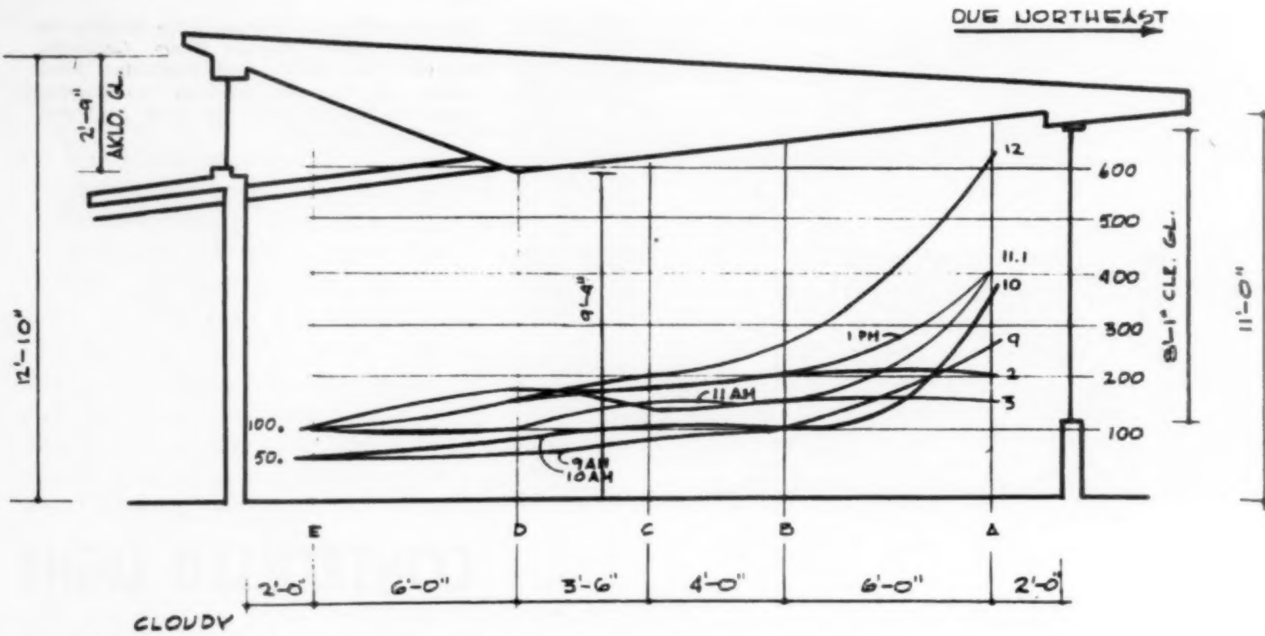
When the Baldwin Hills School was built in 1947, visual conditions were decidedly superior to those in many existing schools. Even today, the plant's northeast orientation, wide roof overhang, louvered southwest clerestory and landscaping produce visual conditions seldom surpassed in a daylighted school.

A Luminous System Is Developed

Although the human eye can adjust to wide variations in lighting conditions, there is a point where variation becomes too great—and eyestrain follows. The student's learning process is then retarded. Mindful of this, the responsible school architect must assure children the healthiest visual environment possible.

Toward such an end, the architectural firm of Richard J. Neutra and Robert E. Alexander, in cooperation with Earl Holmberg, consulting electrical engineer and the Lightrend Company, has developed a new system of controlled lighting for the Alamitos Intermediate School at Garden Grove, California. The system constitutes a noteworthy advance in classroom design.

Classroom light at the new school is dependent



Studies of lighting intensities in two types of classroom illumination are recorded in the charts on this and the next page. Intensity varies extensively within the room from hour to hour and from season to season in the lighting system partially dependent on daylight. Day involved is June 13, 1949.

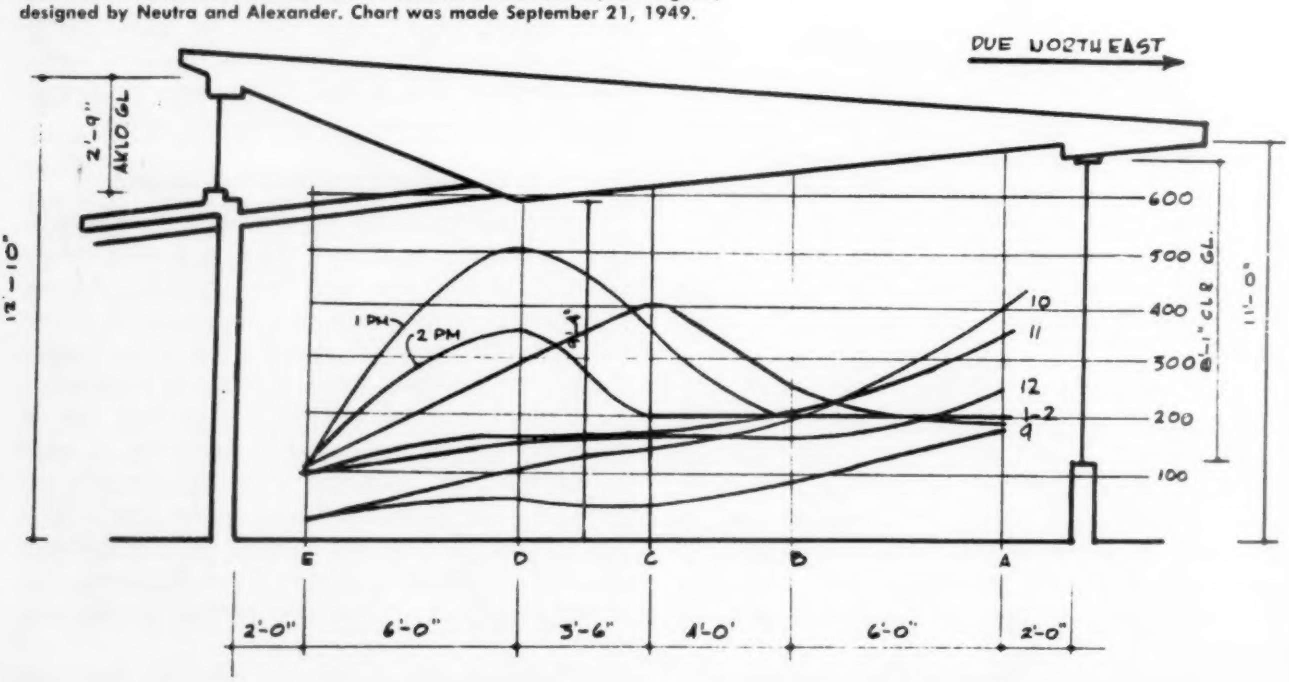
solely upon a luminous system which consists of twelve equal rows of slim-line fluorescent lamps mounted 30 inches on center in sockets dropped six inches beneath the structural ceiling. Immediately below each lamp a translucent plastic shield diffuses and redirects light to the ceiling.

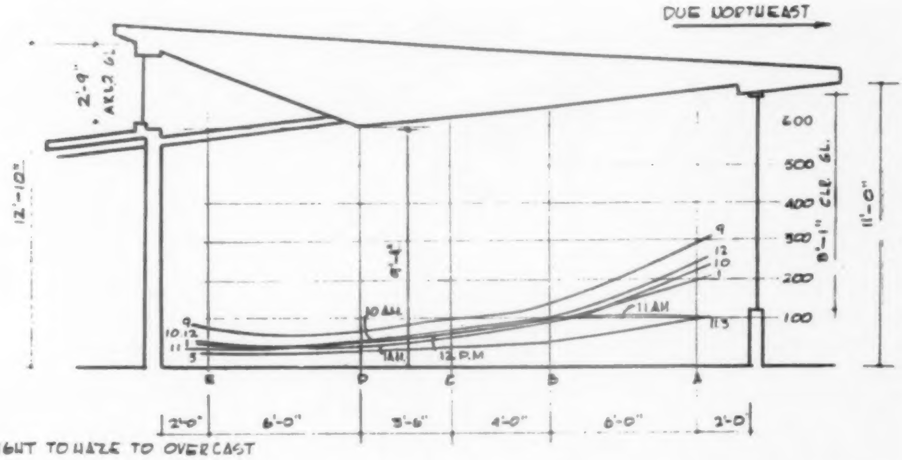
This creates, in effect, a series of single lamp, semi-indirect fixtures, with the structural ceiling serving as light source for the room. A non-modular ceiling of 1" x 1" x 1" aluminum eggcrates forms a light diffusing ceiling and shield, suspended 18 inches beneath the structural ceiling.

Classroom lighting requirements which should be met in every school are answered by this system as follows:

Uniform diffusion of adequate light. The accompanying chart shows how the system achieves constant 50-foot-candle intensity throughout the room, with only a slight rise near the glare-reducing glass doors which form one wall of the room.

Dark corners may be noted, along with too-bright areas near the window. Classroom involved here and above is in the Baldwin Hills School, Los Angeles, designed by Neutra and Alexander. Chart was made September 21, 1949.





Classroom light at desk height in the Baldwin Hills School is recorded by the hour, for the day of January 11, 1952.

Controlled light. With good seeing conditions dependent upon visual relationships rather than on quantity of light, control of light is necessary regardless of the amount or source. This is possible in a system that does not call upon daylighting as a light source.

Absence of glare. The problem of glare has often been neglected in illumination systems where light quantity, not quality, has been the principal concern. In common lighting fixtures, brightnesses of 400 to 900 foot-lamberts are usual and considered good. In normal plastic-type luminous ceilings, brightnesses of 100 foot-lamberts are standard. However, lack of shielding, maintenance, fragility, inflammability and inadequate ventilation present problems in these ceilings.

No Reflected Glare

The system at Alamitos Intermediate School, which maintains brightness substantially lower than 100, contains no reflected glare since the tubes are shielded. Light is evenly balanced and the luminous ceiling is barely noticed. Upon entering the room, the student need not adjust to a luminous ceiling surface and then re-adjust to surfaces that are dim by contrast. Harsh shadows are absent.

The condition achieved is that of a well lighted classroom when the lights are on, yet with each occupant's eyes shaded so that he does not see the light source. This condition has not been attained previously.

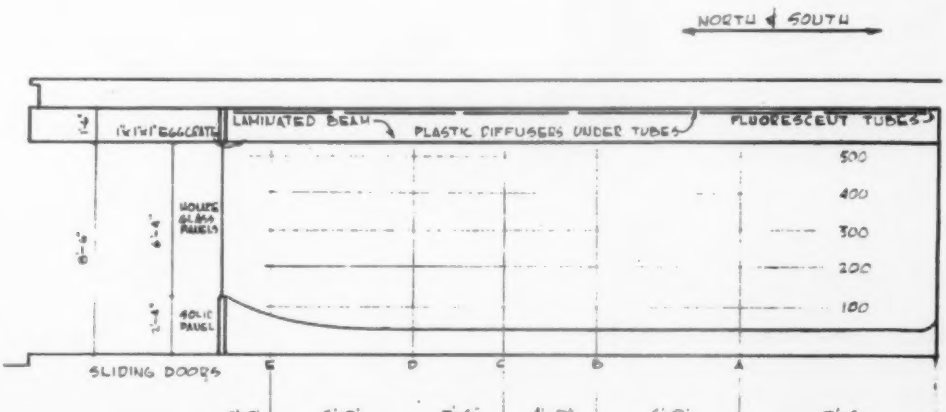
Multi-directional light. The student at Alamitos Intermediate School can work facing in any direction with equal comfort, since the diffused, reflected, multi-directional light pervades every corner of the room.

Simple Design Is Attained

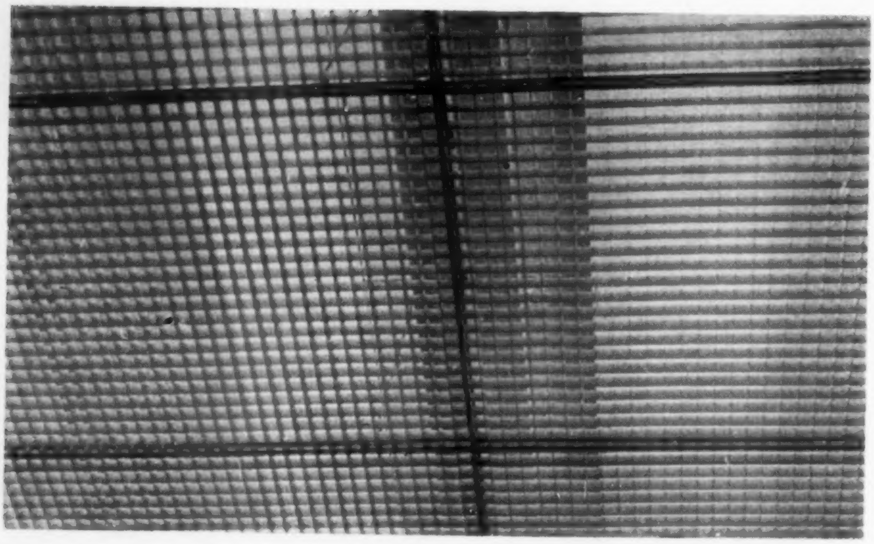
Simple design. Simple design is attained through the absence of T-track supports and through the overall pattern of the eggcrate. In appearance, here is a continuous sweep of ceiling of attractive texture. When looking upward, students do not see the fluorescent tubes, and the structural ceiling and plastic diffusers appear to blend together. Density of the plastic shields is properly balanced. This room is a contrast to classrooms that tend to become complicated, tiring space enclosures in the effort to capture daylight.

Aspects of Economy

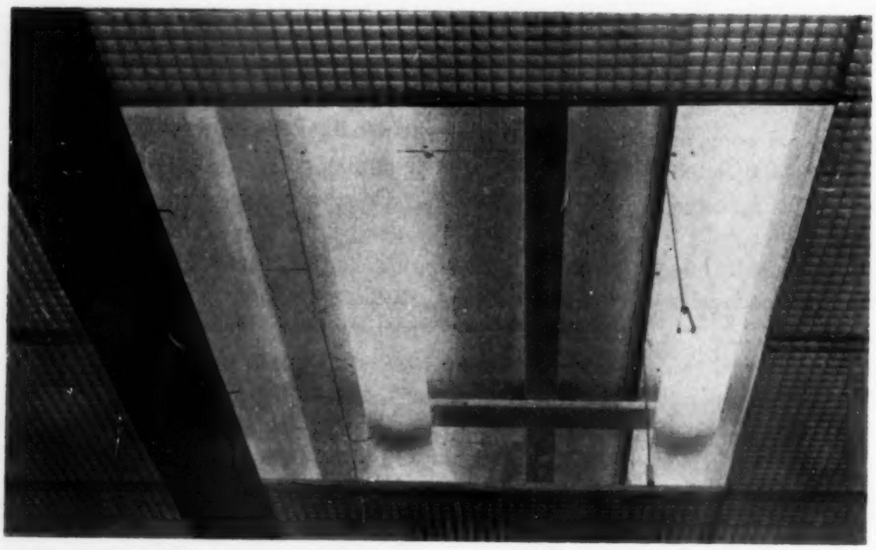
Aspects of economy associated with the Neutra-Alexander system tend to offset the cost of artificial lighting. The architects believe that funds spent on high ceilings, sun shades, skylights and broad overhangs to achieve—in the end—relatively uncontrolled results are better spent on a predictable, uniform, controlled artificial lighting installation. The Garden Grove



At the Alamitos Intermediate School, the luminous-type ceiling, not dependent on daylight, achieves even intensity throughout the room at all times. There is also absence of glare in this system developed by architects Richard J. Neutra and Robert E. Alexander, electrical engineer Earl Holmberg and the Lightrend Company.

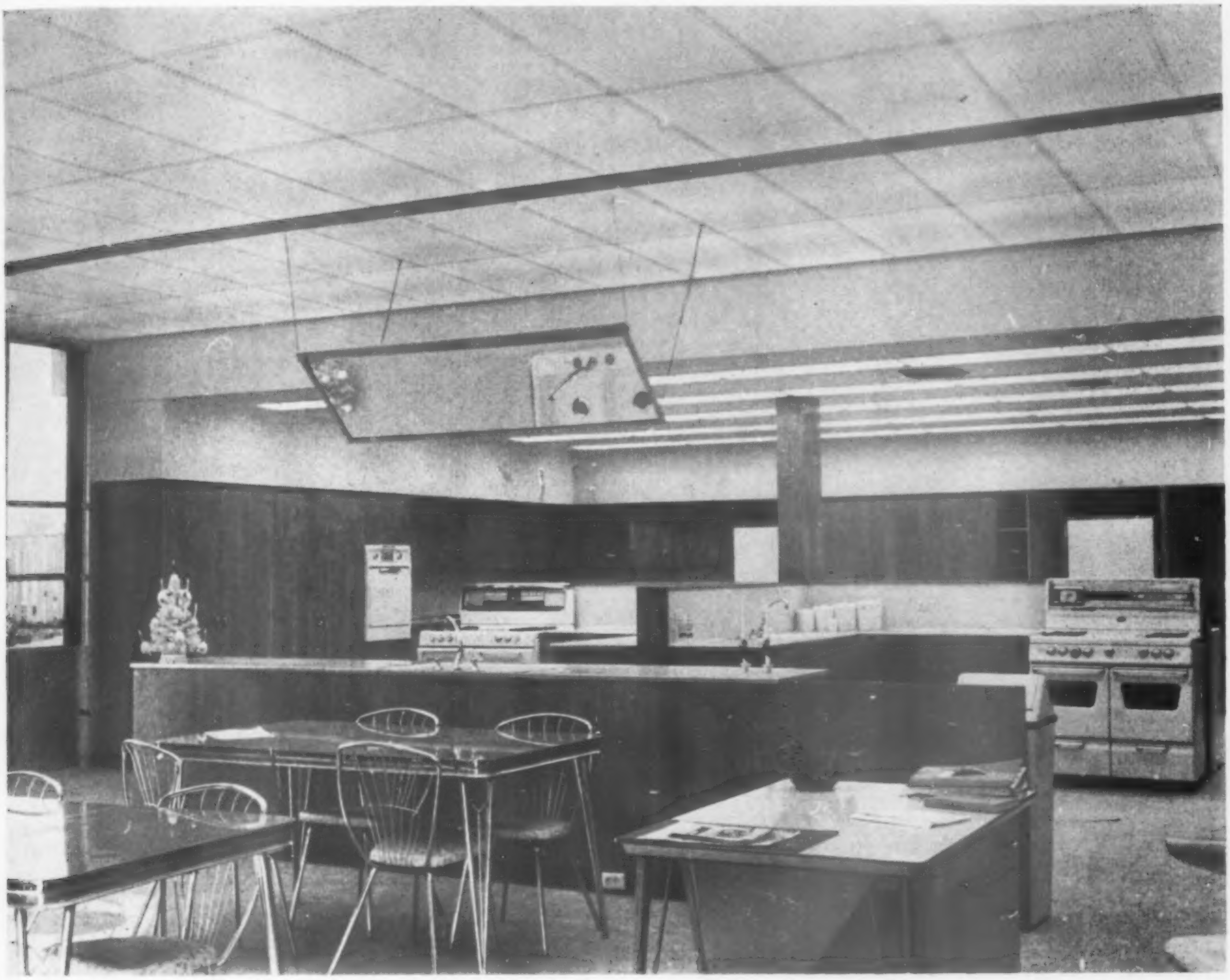


The simplicity of the eggcrate light diffuser ceiling permits an uncluttered, pleasing classroom design.



A section of the aluminum eggcrate light diffuser is removed to reveal the translucent plastic shields that diffuse and redirect light to the structural ceiling above.

The light diffuser panels are easily removed for occasional necessary relamping and cleaning.



The homemaking room of the Alamitos Intermediate School is permeated with warm, evenly diffused light. Students can work facing in any direction and experience equal eye comfort at all times. Kitchen alcoves, away from the windows, are by no means gloomy corners of the area.

School is a moderate-cost plant designed around its lighting system, which is expensive but permits savings in other construction elements.

Eggcrate Achieves Low-Ceiling Room

The eggcrate, for instance, achieves a low-ceiling room (noteworthy from the design standpoint, since it helps maintain a "child-size" scale). Finished areas are confined below the eggcrate ceiling. Windows as a light source are not needed, permitting a saving in wall construction expense. Since the eggcrate itself absorbs reverberation, expensive acoustic tile above the diffuser ceiling is unnecessary. The eggcrate also offers excellent diffusion for the forced hot air heating and ventilating system hidden above the suspended ceiling.

Maintenance of the system is inexpensive. The eggcrate sections do not collect dirt, are not easily damaged and may be lifted out in sections, making occasional relamping and cleaning a simple matter. As for operating expense, screened fluorescent lamps, which provide a better luminous environment than incandescent fixtures, can be burned all day at a cost lower than that of burning incandescent lights part of the day in classrooms dependent partly on daylight. Since the fluorescent tubes are not seen, they are a simpler type and less expensive than lamps designed for a visible ceiling.

Previous types of luminous ceilings have several disadvantages that have been eliminated in the system at Garden Grove. Where lamps are shielded by a solid plastic sheet, there is a fire hazard, and the plastic eventually discolors and must be replaced. Surface brightness often becomes objectionable as foot-candle intensities are increased.

On the other hand, many louvered luminous ceilings are unsatisfactory because unshielded lamps shining through the louvers give high brightnesses in direct view and reflect glare from bright objects in the room. In louvered luminous ceilings, where direct vi-

The light diffuser ceiling is low, being 8′6″ in height. A "child-size" scale is followed throughout the Alamitos School.

sion of the lamps is cut off, louvers still reflect images of the tubes. In addition, some types of luminous ceilings use grid support systems that may give an unsightly, distracting, mechanical appearance to the classroom. And some designs are easily damaged.

A Study in Texas

What is accomplished with the lighting system at the Garden Grove School can be fully appreciated when the significance of proper lighting is pointed out. This was revealed on a large scale several years ago in a study affecting 160,000 public school children in 4000 Texas classrooms. Brightness contrasts in the classrooms were diminished until they did not exceed one to five anywhere in the binocular field. Effects of this simple step confirmed that wholesome normalcy and free play in the entire body will result.

Sixty-five percent of refractive eye difficulties—supposedly amendable by glasses only—disappeared after students had spent six months in the properly illuminated classrooms. In addition, 47 percent of malnutrition symptoms ceased. This was attributed to the fact that students' energy was conserved through elimination of muscular strain resulting from malposture—recognized as a condition often induced by troublesome brightness distribution levels. A further revelation of the study was elimination of 40 percent of chronic infections, nose-ear-throat ailments and deficient functionings.

Thus proper lighting, which bears strongly on children's health and development, is a controllable factor, and should be subject to control. The illumination system at Alamitos Intermediate School is an outcome of Neutra and Alexander's striving toward improved control and predictability of all phases of man-regulated environment.

Architects Walter Wagner and Partners of Fresno designed buildings for the new campus of Coalinga College in the San Joaquin Valley.

SMALL COMMUNITY COLLEGE BUILDING REQUIREMENTS

by JAMES G. BUNKER

Superintendent, High School District and Junior College, Coalinga, California

James G. Bunker has B.A. and M.A. degrees from the University of California. He was a teacher, counselor and coach at the Greenville Junior-Senior High School from 1937-1942, and served at the same school as principal from 1942-1948. For the next five years Mr. Bunker was district superintendent of the Red Bluff Union High School District. He came to the Coalinga Union High School District and Junior College as district superintendent in 1952.

COALINGA Junior College celebrated its silver anniversary September, 1957, on its new campus, one of the most modern and distinctive in the State of California. The silver anniversary marks the culmination of the development of Coalinga College from an extension center of a state college to an integrated community college, in keeping with the pattern of junior college movement in California.

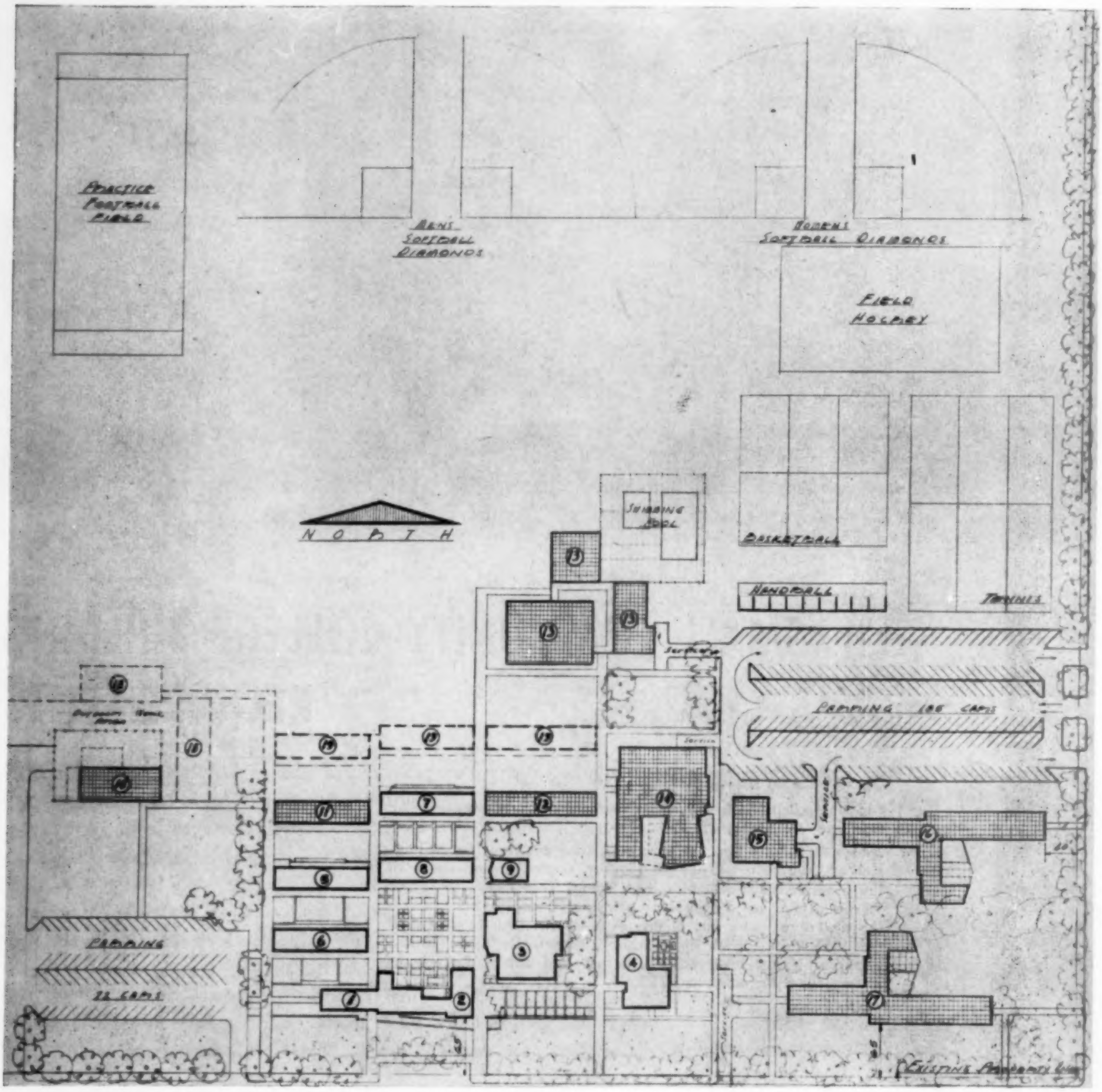
Coalinga College is operated by the Coalinga Union High School District and Junior College. The district is located in western Fresno County in the heart of the San Joaquin Valley and embraces 900 square miles, with a population of approximately 15,000. The sustaining industries are oil production and large scale agriculture.

The assessed valuation of the district is in excess of $160,000,000. A junior high school, a high school and the junior college are all located in Coalinga, a sixth class city with a population of 6,500. The junior and senior high schools share an 80 acre campus adjacent to the 40 acre junior college campus.

Coalinga Junior College began in 1932 as an extension center of Fresno State College. In 1941 it became an independent junior college under the control of the Coalinga Union High School District. Its enrollment fluctuated with economic conditions and with World War II, ranging from a low of 40 to a high of 175 to 180. It was given two small wings on the high school campus and, in many respects, was the step-child of the district.

A Decision to Separate Facilities

Not until 1950 was serious consideration given to separating the college from the two high schools. In that



Existing buildings on the campus are:

1. Faculty Offices
2. Administration
3. Library
4. Student Center
5. Science Wing
6. Science Wing
7. Business and Commercial
8. General Classrooms
9. Lecture Hall

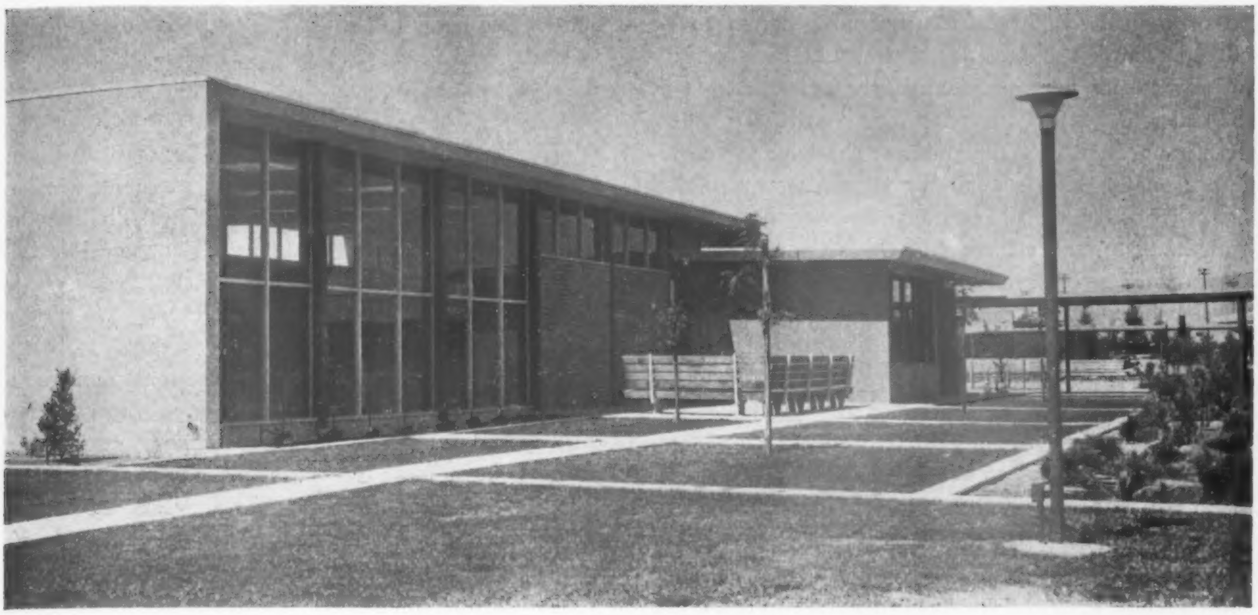
Areas reserved for expansion are:

18. Shops
19. Classrooms

Proposed buildings include:

10. Auto Mechanics Shop
11. Electronics, Engineering, Drawing, Science Lecture
12. Arts, Homemaking and General Classroom
13. Gymnasium, Pool, Locker Rooms
14. Music, Dramatics, Speech
15. Cafeteria
16. Men's Residence Hall
17. Women's Residence Hall

Shaded areas represent proposed immediate construction projects; buildings outlined with solid lines are existing structures; broken lines indicate future construction. Walter Wagner & Partners are the architects and engineers of the site utilization campus plan. Enrollment in Coalinga College in September, 1955, was slightly over 200 students. Population studies of the district pointed to an enrollment of 250 to 300 students by 1959–60. Booming population of the state and local area indicates that many more students will enroll during the 1960's. It was decided, then, to plan final facilities to accommodate 600 students.



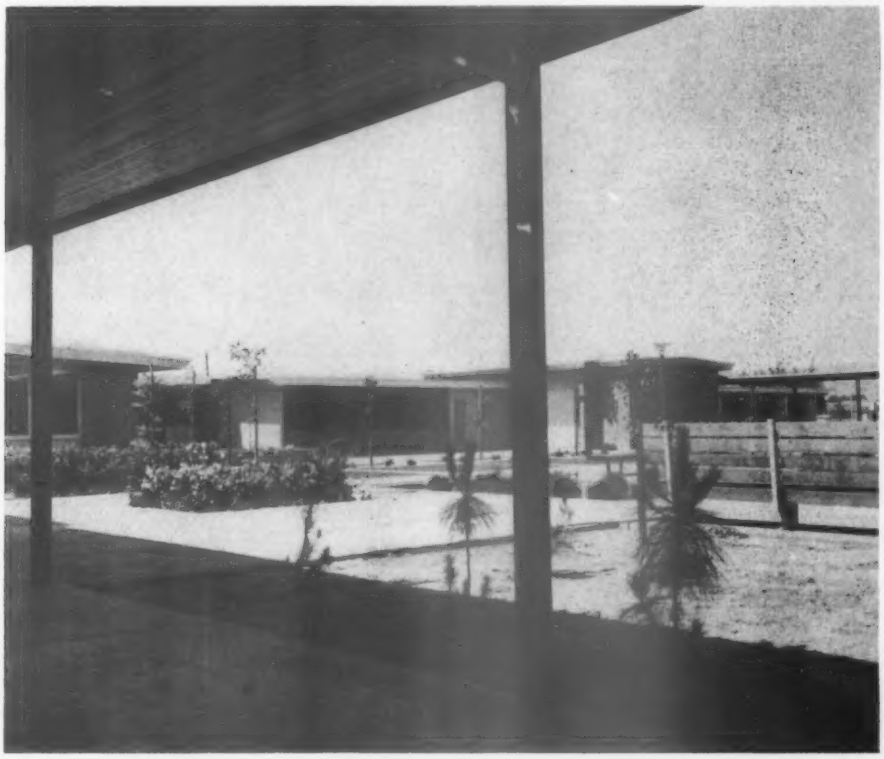
South view of the Coalinga College library.

year a 40 acre parcel of land adjoining the high school campus was purchased for a separate junior college. However, nothing concrete was done until a new governing board came into power on July 1, 1954. The membership of this board was unanimously determined to provide separate junior college facilities. It directed the superintendent and the architectural firm of Walter Wagner and Partners of Fresno to plan a separate junior college for the community.

It might be noted here that a junior college that shares the same campus and buildings with a high school operates under rather obvious handicaps. Serious difficulties arise in scheduling classes. The disparity in the ages of students on both levels creates both educational and psychological problems. Finally, a true college atmosphere cannot be developed when both high school and college students share the same buildings. These were the basic reasons why the governing board was determined to develop a separate junior college.

Considerations in Planning

In planning requirements for this new college several factors had to be borne in mind: First, and foremost, was the total enrollment for which the college should



Master plan of the campus provides the basic units needed for an initial enrollment of 300 students. Facilities are indicated for a complete campus with 600 students.

be planned. Second, the educational program to be offered. Third, the facilities that would be necessary to provide this program. Fourth, the determination of the order in which units should be constructed. Fifth, the arrangement of a schedule for the joint use of facilities on the high school campus during the period that the college would be experiencing its greatest growth. Sixth, the selection of the style and type of architecture. And, seventh, the projection of a plan for the financing of the building program.

Enrollment in Coalinga College in September, 1953, was slightly over 200 students. Population studies of the district, including enrollment trends in elementary and high school, pointed to a district and community enrollment of 250 to 300 students by 1959–60. The booming population of the state and the almost inevitable growth of the area, coupled with the tremendous demand for college facilities forecast for the 1960's, indicated that a junior college in Coalinga would in all likelihood eventually attract many more students than its community base would provide.

It was finally decided to plan facilities for 600 students. This decision was based upon the assumption that facilities planned for double the enrollment foreseeable for 1959–60 should be sufficient.

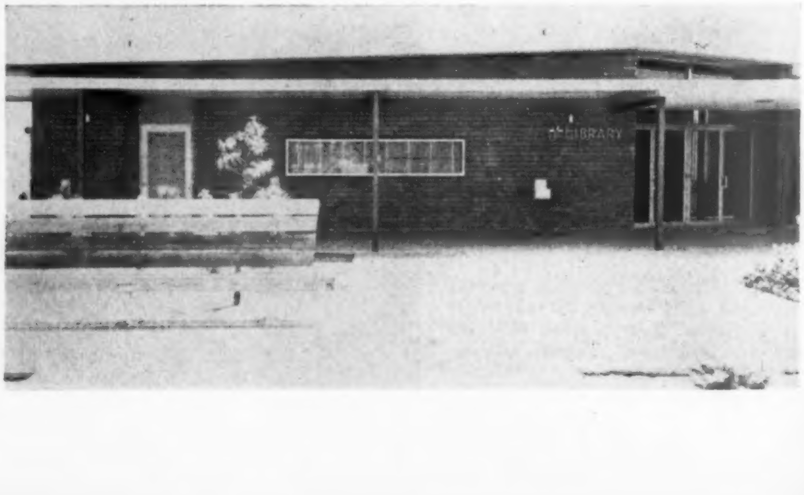
With the basic enrollment decision reached, the library, the administrative unit and the student center were designed to accommodate 600 full time day students. Classrooms and other buildings could be added as needed, but the heart of the campus was established.

Residences for Men and Women

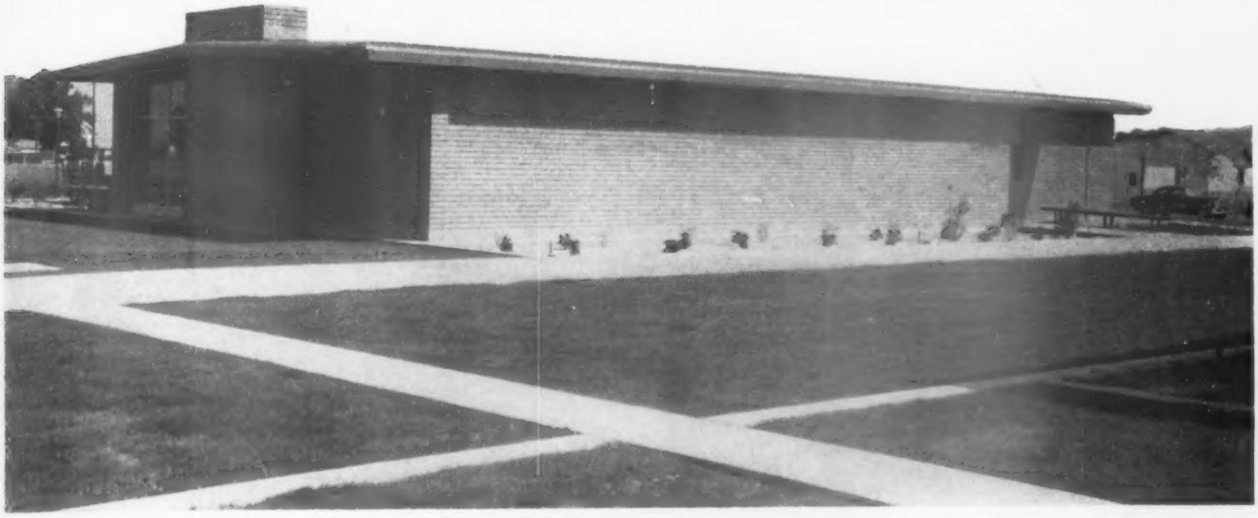
Another basic decision made in the early stages of planning was to build residences for men and women. Few California junior colleges house students, but the situation in Coalinga was different. The local enrollment, as we have mentioned, was slightly over 200 students. The Strayer Committee's *Report of a Survey of the Needs of California in Higher Education*, 1948, had recommended 400 students as the minimum enrollment for an adequate junior college program. Consequently, in order to offer the community students a junior college education equivalent to that found in most junior colleges in the state, the desired enrollment could be reached only by registrations from outside the defined community area.

Since the community of Coalinga lacked adequate student housing, the provision of good housing became, then, the responsibility of the college. It was concluded that of the estimated maximum of 600 students, about 350 to 375 eventually would come from the community or from the adjacent area. The city might provide housing for some 75 students, leaving 150 to be housed by the college. As men outnumber women by two to one, separate residence halls were planned for 54 women and 102 men.

Library interior is lighted by artificial fixtures as well as daylight entering through the clerestory windows. Structural members contrast with the acoustical ceiling and wood paneling on the far wall.



Low lines of the library building harmonize with other campus structures. Library was planned to seat 90 students and house 20,000 volumes.



Student center was among the first new structures to rise on the Coalinga College campus. Structure has its own outdoor court, reached through wide glass doors.

Groupings of comfortable upholstered furniture are arranged here and there within the student center. Tables and chairs are also provided.

The core educational program to be offered was already in existence. It needed refinement and definition but no extraordinary changes were contemplated. The university parallel program and general education program raised no problems in the planning of facilities. A decision on the extent of terminal vocational offerings, however, was vital.

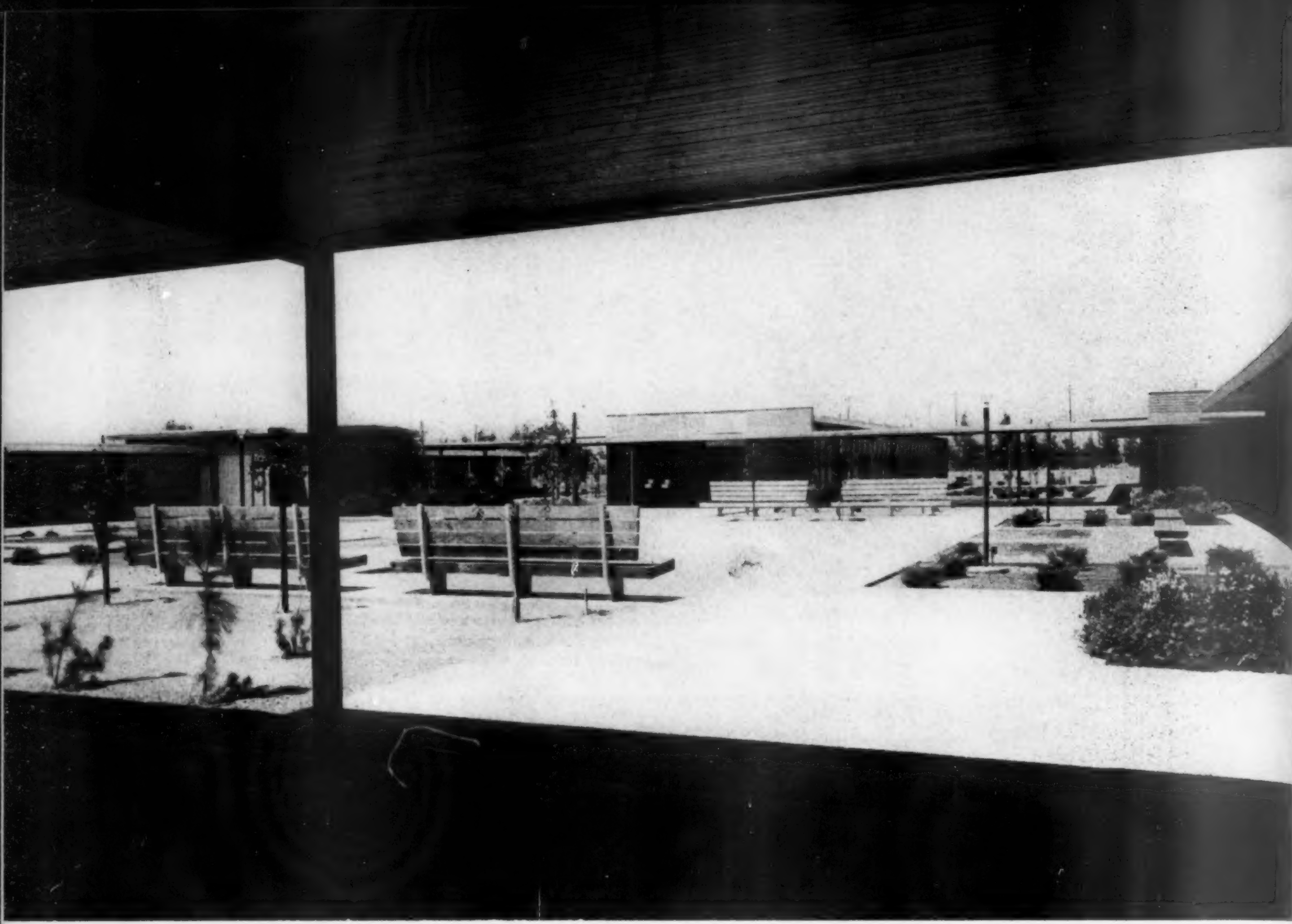
Choosing the Vocational Program

Since agriculture, aside from oil production, is the sustaining occupation of the area, this field was of primary importance. The district already has in operation a 153 acre farm complete with shops, classrooms, a laboratory and a reference library. Agriculture, then, is adequately covered. Automotive equipment plays an important part in the agricultural life of the community, and the demand for mechanics was found to be extremely high. Training in auto mechanics is an essential community and area need. Television and radio repair is another.

Thus, along with the usual program of training in the commercial and business fields, the vocational program was established. Further additions in the area of vocational training, it was felt, would come in response to future community demands. Land areas on the campus are reserved for buildings for future, but now unknown, vocational needs.

Classroom and Lab Facilities

Basic classroom and laboratory facilities were planned in accordance with a general formula suggested by a California State Department of Education handbook entitled, *Planning Junior Colleges.* The formula, derived from the actual experiences of many junior colleges in the state, served as a valuable guide for the number of general classrooms, science laboratories,



The main exterior court on the Coalinga College campus is fringed by the faculty offices and administration building, library, lecture hall, classroom unit and science wings.

commercial rooms, etc., needed for a given enrollment. To date the formula has worked well in our situation.

Master Plan for 300 Students

A master plan of the campus was developed which provided the basic units needed for an initial enrollment of 300 students, as well as all facilities needed for a complete campus with 600 students. Facilities provided in the basic units, in general conformance with the formula mentioned above, included the following:

Administration, containing offices for the director, dean of instruction, registrar, dean of men, dean of women, etc.; faculty offices for 20 instructors; a library to seat 90 students with stack facilities for 20,000 volumes; a student center; science laboratories for quantitative and qualitative chemistry, physics, geology and botany-biology; 3 business and commercial classrooms; 6 general purpose classrooms and a lecture hall to seat 120 students.

Facilities in Joint Use

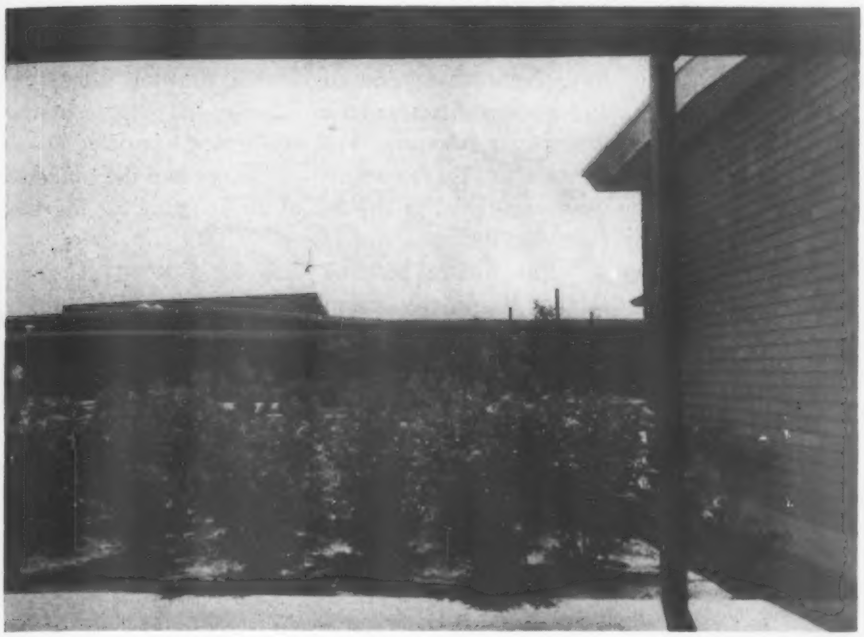
Pending what was hoped would be a gradual growth of the college, thus allowing time to construct additional buildings, it was planned to use jointly with the high school the following facilities: cafeteria, boys' and girls' gymnasiums, swimming pool, auto shop, electronics laboratory, art, dramatics, music and homemaking. The high school buildings are reasonably close to the new campus and the facilities can be shared easily until the college is able to provide its own.

The football bowl, seating 4,000, with ample parking lots, and 15 acres of baseball fields and lawn athletic fields, are also jointly used. The football bowl, where seating can be expanded to 6,000 will serve both high school and college indefinitely.

Cooperation From All Concerned

All through the planning of the new college campus there was the closest cooperation among the governing board and superintendent, the architectural firm of Walter Wagner and Partners, with Mr. Paul Schoenwald as chief design architect, the director of the college, Mr. Alfred M. Livingston, and the faculty of the college. The architectural style was determined chiefly by the board after a series of visits to other junior colleges in the state.

Low, one story design was chosen with wide use of brick and steel paneling for minimal maintenance. Air conditioning and complete reliance upon artificial light in all classrooms were agreed upon at the outset.



Plants and shrubs add to the charm of the exterior courts. The heart of the campus has been established, with new structures to be added according to the master plan.

The detailed educational planning of each building was worked out in consultation with each teaching and administrative staff member.

Financing the Project

Since the assessed valuation of the district was over $160,000,000 in 1954, the governing board decided to finance the new college on a pay-as-you-go basis. Over a half million dollars a year from current revenue could be set aside for college construction.

By September, 1955, when bids were opened, nearly a million dollars had been accumulated. The total bid was $821,660 including all fixed science equipment and $55,520 for site development and landscaping.

The basic units were occupied in September, 1956. The total student registration was over 350, nearly 20 percent higher than had been anticipated. As a consequence our classrooms, particularly the science facilities which were used for lecture as well as laboratory purposes, were crowded. It was obvious that additions would have to be provided more quickly than had originally been contemplated.

An Attempt to Meet Needs

It now appeared that the college enrollment might reach 600 in three or four years. The governing board decided to complete the college in one contract, to be constructed by February, 1959. This would cost $2,500,000 and necessitated a bond election. The people of the district, however, did not feel that the college should be developed this rapidly, and rejected the bond issue in March, 1957.

A majority of the voters had cast their ballots for the proposal, so it was apparent that the people wanted the college completed, but on a continuation of the pay-as-you-go basis. As a consequence the board

Coalinga Junior College began in 1932 as an extension center of Fresno State College. In 1941 it became an independent junior college. It now enjoys a brand new campus with room for expansion.

adopted, upon the recommendation of the superintendent and college administrative staff, a priority system for completing the college as follows:

July 1, 1957	
2 Classroom Wings and Auto Mechanics Shop	$380,000
July 1, 1958	
Women's Residence, Cafeteria	$450,000
July 1, 1959	
Gymnasium, Locker Rooms, Athletic Fields	$600,000
July 1, 1961	
Men's Residence	$640,000

In August, 1957, a contract was let for the auto mechanics shop and two classroom wings. One classroom wing houses an electronics and television laboratory, a mechanical and engineering drawing laboratory and a science lecture room. The second wing contains a large art laboratory and two general purpose classrooms. Plans for the women's residence and the cafeteria were completed in the fall of 1957, ready for bid the following summer.

The master building plan for Coalinga College should be largely completed by September, 1962. Changes in the priority of building construction may be made, but the basic master plan will not be altered. The experience of the past several years would indicate that Coalinga College will continue to move forward in an orderly way toward its completion as one of California's outstanding community colleges.

Close cooperation among the governing board, superintendent, architects and designers, director of the college and the faculty resulted in a college campus without parallel within the state.

Junior colleges have been able to concentrate on developing the best possible instruction in certain chosen fields.

Sprague

LET'S KEEP OUR JUNIOR COLLEGES PUBLIC

by C. J. MARTIN

Engelhardt, Engelhardt, Leggett and Cornell, Educational Consultants, New York City

Dr. Martin has an A.B. degree from Presbyterian College, an M.Ed. from the University of South Carolina and an M.A. and Ed.D. from Columbia University. Before World War II he was a school superintendent in Ellenton and Wagener, S.C. From 1941–1945 he was a lieutenant colonel in Reserve in the U.S. Army. Later Dr. Martin was with the S. C. State Department of Education and was an assistant superintendent of the Greenville County Schools.

THE first public junior college, still in existence, was founded in Joliet, Illinois, in 1902.* Public junior colleges vary in many ways. Some are wholly tax supported, others depend partly on tuition. Some are integrated with a local high school, others are separate institutions. Some are state controlled; others are controlled by local boards of education.

Private junior colleges have been in existence much longer than the public-supported institutions. These private establishments were founded by individuals, by societies, and by churches to meet specific needs or purposes. Many of them were begun by church denominations as a training ground for ministers and other religious workers. Scores of these have developed into four-year colleges of liberal arts. However, the long-term trend in the junior college movement in America today is toward more publicly-supported and controlled institutions.

The public junior college should be controlled and operated locally, as is the high school. Of necessity, the local community which supports the junior college may be larger than the high school area. The American public school system once consisted of hundreds of thousands of independent, small districts. Every community had its own school. It was soon learned that in order to support a good high school program it was necessary to enlarge the area served for two reasons. One was to obtain a broader tax base, and the other was to make sure that there would be a sufficient number of boys and girls to justify a good educational program.

Centralizing the School Districts

For many years New York State has been a leader in the effort to establish school districts large enough and with the financial ability necessary to support a complete educational program. The movement in this state to "centralize" school districts has made remarkable progress. The trend now is to centralize districts which have already been centralized, making them even larger.

There is no virtue in "bigness" itself. Everyone will agree that some of our large city school systems have become monsters because of their size. Efforts are being made today to decentralize some of the larger systems so that the schools may be closer to the people. Never-

**The Public Junior College,* National Society for the Study of Education Yearbook 1956.

Colleges and universities throughout the country are facing the greatest influx of students in their history. Public junior colleges can lighten the load.

theless, the fact remains that rural and sparsely populated areas need centralization or consolidation in order to support adequately a good school system.

The public junior college requires more tax base than the public high school. In order to meet accrediting standards, the junior college must have better prepared faculty members, a lower student-teacher ratio, more and better equipment, particularly in science, and better libraries. All of this adds up to a higher expenditure per pupil than is necessary on the secondary level. If communities are to be able to establish and support such institutions, then we must redefine what we mean by the word "community."

Financial Aid for Junior Colleges

Several states have passed permissive legislation dealing with public junior colleges. A more limited number have provided funds to encourage communities to establish such institutions. Financial aid from the state will be necessary to enable most areas in the country to take this step since the initial cost of buildings alone is apt to be prohibitive.

Often, the so-called public junior college has been started by private philanthropy. Little Rock Junior College in Arkansas is an example of this. It receives a portion of its operating funds from an estate, but is controlled by the city board of education. There are other junior colleges which are similarly operated. This is the exception rather than the rule, however. If the truly public junior college is to develop as it should, it must receive the same state aid that our public schools receive.

Public junior colleges should meet the needs of the communities they serve. Special institutions have been founded to meet specific needs and purposes. These junior colleges have been able to concentrate on developing the best possible instruction in certain chosen fields. This has been good for education and for the country. Some of our most significant developments have come from these schools which have served as laboratories for experimenting with new ideas.

Curriculum for the Community

But, again, if the institution is to be publicly supported and controlled it must accomplish what the high school has been attempting to do for many years. The curriculum of the public junior college should reflect the needs and demands of the geographical area in which it is located. The purposes of junior colleges have been defined by authorities in this field. It is agreed that there are four major purposes. First, there is the transfer function—to prepare the high school graduate for more advanced study. Colleges and universities are facing the greatest influx of students in their history. This is caused not only by increased birth rates, but also by a renewed interest in attending college. More and more individuals are realizing the value and necessity of post high school training.

According to Dr. Raymond Walters of the University of Cincinnati about four out of every ten high school graduates of last June registered in September for some form of advanced study. If this percentage remains as it is, consider the tremendous outcome during the 1960's when the millions of children born after World War II will be clamoring for admission to college. Public junior colleges will do much to relieve this shock. Even so, colleges and universities will be forced to expand. More youngsters should be able to obtain the first two years of training at the local level.

Vocational Education Is Important

Another purpose of the junior college has been recognized as providing either terminal or preparatory vocational education. Training of individuals in the vocational skills and techniques necessary in our complex society is extremely important. The advance of

Junior colleges can provide either terminal or preparatory vocational education.

Junior colleges serve to give adults an opportunity to continue their education.

technology has created new jobs demanding new skills. Special schools are operated for specific training in various fields. The public junior college must meet the demands and needs of its local community.

A community college located in an area where textiles predominate should provide opportunities for training in this field. Those located in rural areas must include agricultural and/or horticultural instruction in the curriculum. In at least one community where a large pharmaceutical manufacturing plant is located, emphasis is given to the preparation of laboratory technicians. Arguments persist on the merits and demerits of vocational training. Some feel that training in skills and techniques should be the function of industry or specialized schools. However, if we recognize vocational education, either terminal or preparatory, as a logical function of the public junior college, we must adapt the program to the needs and demands of the community.

Provisions for General Education

A third, and significant, purpose of the public junior college has been defined as providing general education, particularly for those who do not contemplate further study. It was primarily for this reason that the movement began some years ago in this country for the extension of the high school to grades thirteen and fourteen. If 40 percent of our high school graduates begin some kind of advanced study what happens to the remaining 60 percent? Obviously, they have completed their formal education, at least for the time being.

Just as it is of consequence to receive training for skills and techniques to satisfy the demands of our technological society, so it is imperative that we develop skills and techniques for living together in one world. Today, it seems, we must learn to live together peaceably or be destroyed. Most colleges and universities devote a great part of the first two years to the field of general education. Why should this training not be available to more young men and women through public junior colleges located near their homes?

Educational Services for Adults

The fourth function of the public junior college may be said to be educational services for the adults of the community, giving them the opportunity for continuing education. More and more people desire to continue studying even during their later years of life. There are many reasons for this: Some who did not go to college feel the need later for advanced study. Others are faced with a change in jobs or responsibilities which require further training. For example, the engineer who has adequate technical training is suddenly placed in a position requiring administrative or managerial skills. He feels the need for further training to equip himself more adequately for his new position. Or there is the person who finds he needs more training in salesmanship to master his vocation.

New technological developments also make it necessary for individuals to resume formal education even though they may have college degrees. Others want to go back to school simply for the pleasure it gives them to learn something new. The person who has always had a desire to paint may enroll in an art course. Another whose interest is mechanical may wish to take a shop course and develop a worthwhile hobby. Many junior colleges enroll more special students who are working either part or full time than they do freshmen and sophomores.

Combined High School-Junior College

Generally speaking, public reaction to the so-called integrated public junior college has been far from enthusiastic in this country. However, there is much to be said for the high school and junior college sharing the same physical facilities, especially from an economical standpoint. Usually, the high school gains from such sharing. In most instances, however, the two institutions separate sooner or later. One of the outstanding examples of the integrated systems, Pasadena, California, operated on this basis from 1928 to 1954. Then the junior college became a separate institution. California and Texas were the pioneers in extending the secondary school to the fourteenth year. Today only one such system remains in each state.

There are now fifteen public junior colleges organized as four-year institutions housing grades eleven through fourteen. Eight of these are located in the State of Mississippi. The remaining seven are in California, Maryland, Texas, Kansas and Missouri. There are many advantages to be found in the four-year junior college. The cost of operation is less when there is only one administration and one faculty. The high school has the advantage usually of better-trained faculty members and better equipment. But in spite of this, separate senior high schools and junior colleges usually emerge.

Size Defeats Integration

It is evident that size influences the permanence of such integration. Obviously, the most economical way to initiate a public junior college program is to combine it with the high school. Then, interest and enrollment gradually increase from year to year. When the junior college reaches 400 or more students, it seems feasible for it to move to its own campus and have a separate administration. High school enrollments are expanding so rapidly that the integrated institution becomes too large to be efficient and still produce a good high school program.

Whatever the cause may be, the four-year public junior college has not developed as many thought it would. Organization is not an end in itself, but a means to an end. It does not really matter whether the junior college is an extension of the secondary school or a separate institution.

The Acceptance of Junior Colleges

The important fact is that acceptance of public institutions offering two years of study beyond high school is increasing. More and more communities are becoming junior college conscious. Cities, towns, counties, and even combinations of counties are making inquiries and planning community colleges. The number has grown from nine in 1900 to 338 in 1954. Ten years from now this figure will probably be doubled. Let's keep these institutions public, operated by the board of education with local and state tax funds. And let's see that they meet the needs and demands of the communities they serve.

The person who has always had a desire to paint may enroll in a community college art course. Many junior colleges enroll more special students who are working either part or full time than they do freshmen and sophomores.

A SMALL COLLEGE PLANS LONG-RANGE EXPANSION

by FRANCIS G. CORNELL

Engelhardt, Engelhardt, Leggett and Cornell, Educational Consultants, New York City

Dr. Cornell completed his undergraduate work at Columbia University where he also received his Ph.D. degree. In addition to teaching and administrative work he has directed research in a number of organizations. Before his present position he was director, Bureau of Research and Service, College of Education, University of Illinois.

and WILLIAM G. LYLES

Lyles, Bissett, Carlisle and Wolff, Architects and Engineers, Columbia, South Carolina

Mr. Lyles holds a B.S. in Architecture degree from Clemson College. From 1938 to 1940 he was a partner in the firm of Stork & Lyles, Architects of Columbia, S. C. He served out the World War II years on construction duty with the U.S. Army. In November, 1945, he resumed partnership in his old firm with Bissett, Carlisle & Wolff as associates. Mr. Lyles' present firm was organized in 1948.

DETERMINATION of the future building needs of a private liberal arts college must take into account many factors not directly related to buildings themselves. This is clearly demonstrated in studies leading to the development of a master building plan for Erskine College in South Carolina. An analysis of the kinds of information needed in the Erskine study showed that they could be grouped under two major headings as follows: How large will the college be? What physical facilities will be needed?

The most complicated and at the same time the most strategic elements in the development of the plan related to the first question. The future size of a college cannot be neatly determined by some simple method of statistical projection, as is commonly used in the anticipation of building needs for rapidly growing elementary and secondary school districts. A privately-supported denominational college will have a more or less constant enrollment or will grow in size, or possibly even decline, despite the overwhelming pressures of increased demands for higher education.

The Planning Background

In the study of Erskine College several steps were thus decided upon as being fundamental in anticipating the future housing requirement, both in a quantitative and a qualitative sense. These elements were obviously related to the future of the institution:

1. An analysis of present and future population served by the institution.
2. The curricular offerings of the institution and their relationship to the lives of students after graduation.
3. The capacity of the physical plant and its suitability for various types of curricular needs of the population served.
4. The general attractiveness and suitability of facilities as an aspect of the competition which the college will have with other institutions for both faculty and students.
5. Policy with reference to students to be served and the admission requirements and standards of scholarship to be employed.
6. The faculty's conception of the role of the institution now and in the future.
7. The expectations of alumni (the supporting population) regarding the institution.
8. Anticipated financial resources in relation to the operating and capital requirements.

Information relating to these items pinpoints the problem and materially reduces the alternatives in answering the question "What facilities are needed?" and in developing a long-term building program.

Background of Erskine

It seemed particularly wise, in viewing the prospects for Erskine College, to decide in what direction to turn sights—in the direction of what the college was and what it is now, or in the direction of what it is becoming. Despite the historical background of institutions, the impact of a changing society upon our student populations and their needs means that functions are changing. This holds true whether we receive guidance from the background of the past, or whether we look to the future.

Consideration of the origins of the college raises questions of how much the past will dictate what will happen in the future. Erskine College, which began as an academy in 1835, had a unique background which restricted the thinking about its future. The academy was established by the Synod of the Associate Reformed Presbyterian Church. When the school opened as a four-year liberal arts college in 1839, it became the first four-year denominational college in South Carolina and among the first of such colleges in the southern states.

In 1837 a professor of Divinity was added to the school, and the School of Theology of Erskine College was created in 1925. A privately-controlled school, the Due West Female College founded in 1860, later came under the control of the Synod of the Associate Reformed Presbyterian Church. In 1927–28 it was united with Erskine College. The layout of the existing campus thus consisted of two areas: one, the original college for men, and the other the original college for women.

Erskine College is still the denominational college for the Associate Reformed Presbyterian Church. It is owned and controlled by the Church under the direct supervision of a Board of Trustees elected by the General Synod. The institution does not limit enrollment to members of the supporting denomination. It invites youth of all faiths to share its benefits. Its location in the community of Due West in Abbeville County, South Carolina, is predominantly rural, although it is conveniently located near the metropolitan center of Greenville, South Carolina. The stated purposes of the institution indicate a dedication to the intellectual, spiritual and personal development of youth.

The Population Served

The population served by Erskine College was examined in terms of geographical distribution of students now enrolled, and the occupation and geographical distribution of students formerly enrolled. The addresses of all students enrolled during the year 1955–56 were examined and a geographical analysis made. The accompanying table shows one of the results of this analysis. It reveals that the college is primarily, in function, a regional liberal arts institution. In this table are distributions of students according to distance of homes from the college. To learn if regional characteristics differed among students who were members of the Associate Reformed Church, a separate tabulation was made according to membership and non-membership in the Church for both men and women. From this table it may be seen that 241 of 350 students, almost 70 percent, are from homes within a 100-mile radius of the campus. One hundred and sixty-four, or almost half, of the student body of 1955–56 came from within a 50-mile radius of the college. Smaller percentages of members of the Associate Reformed Presbyterian Church live within the vicinity of the college. In other words, larger proportions of students who are church members come from other states to attend college at Due West.

Locations of Homes of Students Attending Erskine College, 1955–56

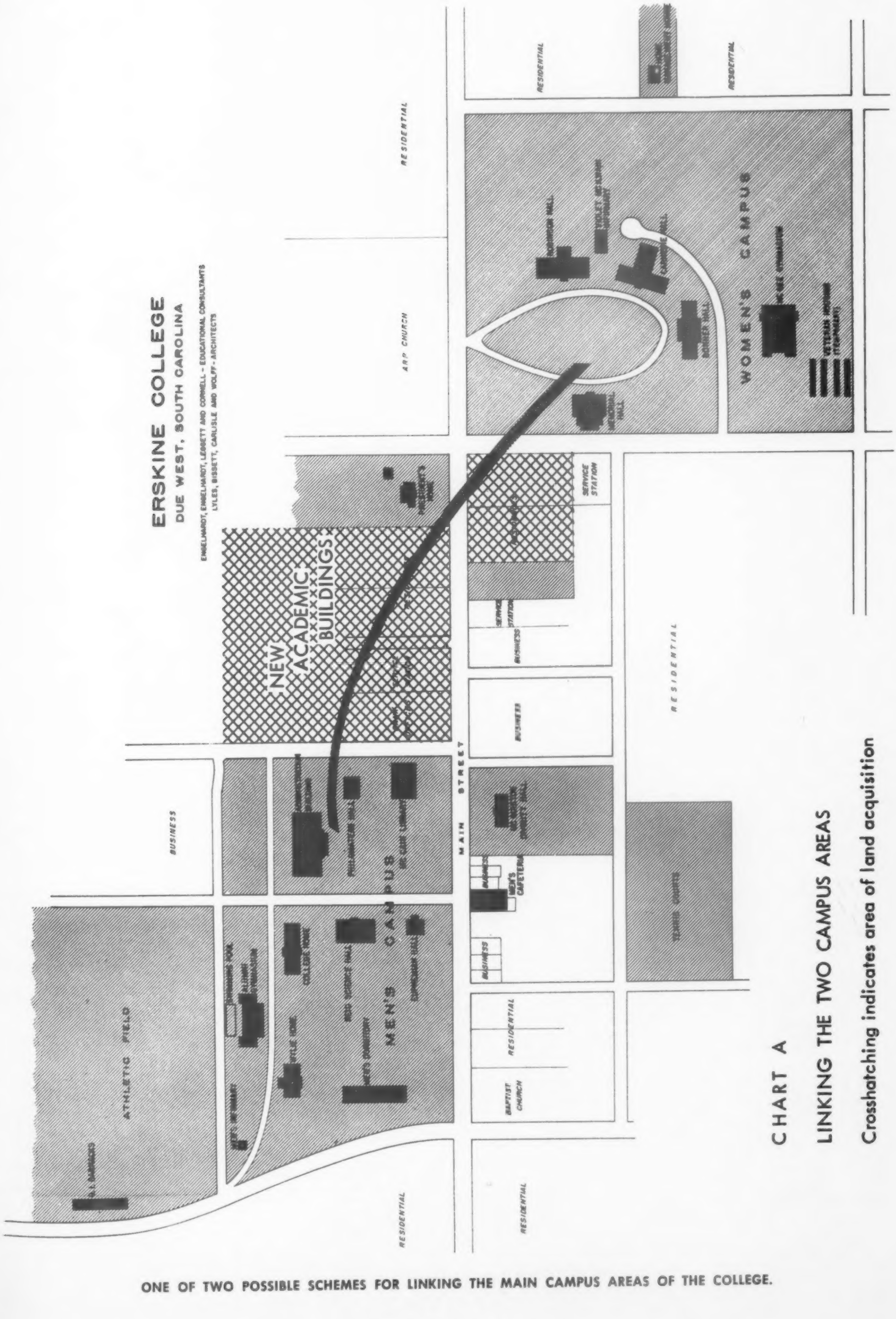
Distance From Erskine	*ARP Students*		*Other Students*		*All Students*
	Men	*Women*	*Men*	*Women*	
Within 25 miles	11	11	79	33	134
25 to 50 miles	1	4	12	13	30
50 to 100 miles	18	23	18	18	77
100 to 200 miles	13	13	23	10	59
Beyond 200 miles	4	14	22	10	50
Total	47	65	154	84	350

Follow-Up of Graduates

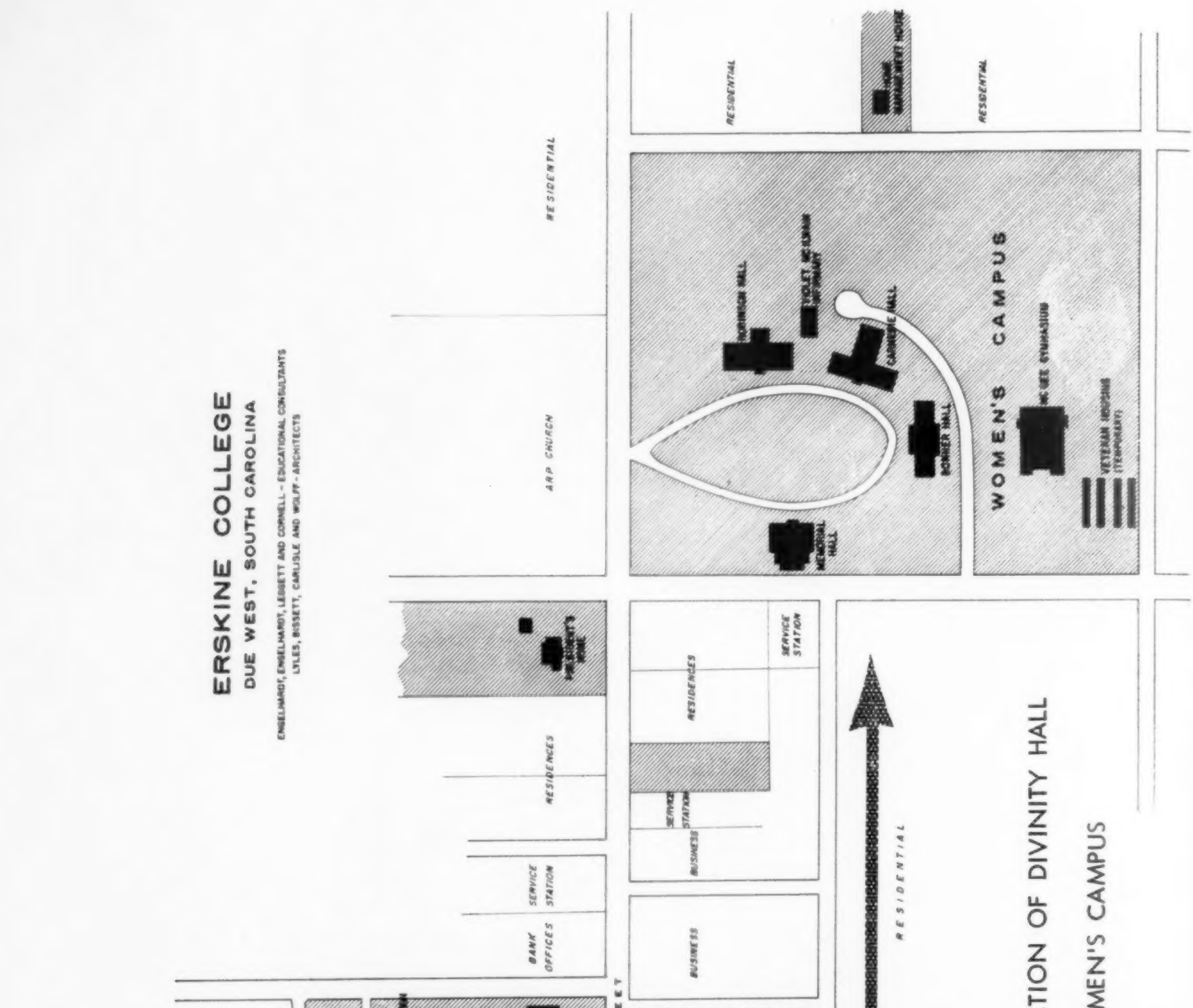
A study of present occupations of graduates over a period of fifteen years since the beginning of World War II, and an analysis of major fields of study in Erskine and in nearby higher education institutions, revealed shifts in curricular areas that would bear on planning future facilities. To compete with other institutions for students, a college is wise to emphasize curricular areas in which there is short supply.

It was observed that such fields of specialization as fine arts, foreign languages, geography, journalism, philosophy and psychology had lower proportions of graduates in South Carolina than in the United States as a whole. In South Carolina there was a relative emphasis in the fields of agriculture, education, the biological sciences and religion. Erskine graduates were majoring mainly in the biological sciences and in education and were low in the fine arts and in the social sciences.

It was assumed that, in great part, the future enrollments of an institution will depend on what it offers, not only in terms of a curriculum to satisfy the needs of the desired number of students, but also in terms of a physical plant and student housing facilities which will enable the program to be carried out. From a study of the demand side, it was evident that the college which



ONE OF TWO POSSIBLE SCHEMES FOR LINKING THE MAIN CAMPUS AREAS OF THE COLLEGE.



SECOND ALTERNATE SCHEME FOR EXPANSION OF THE ERSKINE COLLEGE CAMPUS TO LINK MAIN AREAS.

had never had enrollments in excess of 500 students could expect future enrollments up to 1,000, particularly with some recasting of the curriclum.

It was anticipated that, in addition to the teacher-training emphasis, there would be a strengthening of the curriculum in general or liberal education (as against vocational and professional training), pre-professional education and training for students to be employed in commerce and industry. The follow-up study of Erskine graduates, showing the kinds of things they were doing after graduating, indicated this type of curricular development.

Faculty and Alumni Assessment

Personal interviews with all faculty members proved helpful in developing a faculty consensus of the future role of the institution, and specific needs for changes in curriculum and the physical facilities to accommodate it. Similar information was obtained from alumni, both as a means of learning the sentiments of alumni as the supporting population, regarding the size and future needs of the school, and as an indirect means of assessing the degree of alumni support. The latter had a bearing on the question of economic resources, since in considerable degree such an institution must depend upon fund-raising campaigns for physical facilities. The questionnaire used was simple and straightforward. Responses indicated a highly loyal alumni group.

Questionnaire Sent to Erskine Alumni

1. In general, do you feel your education at Erskine was of value to you?
   Yes....... No....... Uncertain.......
2. What do you consider the most desirable number of students for Erskine College?
   The present number, approximately 400 .... More than 400 but less than 600 .... More than 600 but less than 1,000 .... More than 1,000........
3. Which of the following facilities on the campus do you think should be expanded or improved? (Check twice the one you think is needed most.)
   Classrooms and laboratories:
   General subjects .... Science ....
   Business administration .... Fine arts ....
   Industrial arts ....
   Physical education facilities ....
   Student recreation areas: Outdoor ....
   Indoor ....
   Dining halls .... Library ....
   Dormitories (in addition to Grier Hall for men which will open in 1956) ....
   Chapel and general assembly space .... Offices and general administration ....
4. Please make below any comments you wish concerning emphases which should be considered in future planning for Erskine College.

Fortunately the general attitude of faculty and alumni was in harmony on questions of magnitude dealing with the future of the college. The consultants brought into the picture the question of economy in the operation of a not too small institution. In general, both faculty and alumni favored increasing the size of the institution in so far as this would not result in "something being lost." The "something being lost" meant that close faculty-student relationship and informality now present in the entire social environment of the institution. It was decided that concern about becoming too large need not enter into the picture until one visualized an institution of 2,000 enrollment.

Studies of class size indicated, however, that to provide both present and anticipated course offerings, enrollments of some 400 odd students would require a high ratio of faculty to students, and types of operating costs not suited to the financial situation of the college. In other words, financial advantages would accrue with properly planned expansion to an enrollment of approximately 1,000.

Responses of alumni to specific questions regarding facilities on the campus provided a priority listing which was consistent with the observations of the survey staff, and supported the general hypothesis that alumni from such an institution would have reasonably valid ideas concerning gaps in the physical facilities. The result was, of course, fortunate because it is important, from the public relations standpoint, that steps be taken in a direction which will be supported by alumni. The opinions of alumni regarding space needs are summarized in the table below.

Alumni Reaction to Expansion or Improvement of Campus Facilities

	Most Needed		*Needed*	
Activity	*Number*	*Percent*	*Number*	*Percent*
Classrooms and laboratories				
Business administration	134	17	239	30
General subjects	100	12	237	29
Dormitories	92	11	288	36
Student recreation areas, indoor	67	8	286	35
Classrooms and laboratories				
Science	61	8	144	18
Industrial arts	44	5	147	18
Dining halls	41	5	218	27
Chapel and general assembly space	41	5	210	26
Classrooms and laboratories				
Fine arts	39	5	167	21
Physical education facilities	38	5	226	28
Student recreation areas, outdoor	24	3	231	29
Offices and general administration	18	2	131	16
Library	15	2	122	15

Existing Facilities on Campus

The usual detailed analysis of existing facilities was made in the Erskine College study, along with a tabulation of space utilization. This step is vital in the plan-

ning of college facilities because of the extravagant habits of the past in utilizing facilities, and because of the need for more efficient utilization to accommodate expanding enrollments. Assuming an average of 16 hours weekly per student, the spaces available for instruction at Erskine would accommodate 1,000. This, of course, does not allow for the fact that many teaching stations are not fully acceptable for the courses to be held.

Many of the spaces available are obsolete, not only as a desirable environment for educational activities, but from the standpoint of mechanical safety and other considerations. The utilization study helped to determine the best possible future use of existing facilities and to minimize the amount of new construction required to permit an expansion of the college to 1,000 enrollment.

The Building Program

Analyses of the type suggested blocked out the building needs, with the exception of the non-statistical problem of the relationship of spaces in a future campus plan. One of the most difficult tasks in this respect was to locate new academic buildings to link the space between two separate divisions, the men's campus and the women's campus. The fact that the two campuses bracketed the commercial center of the village complicated the analysis.

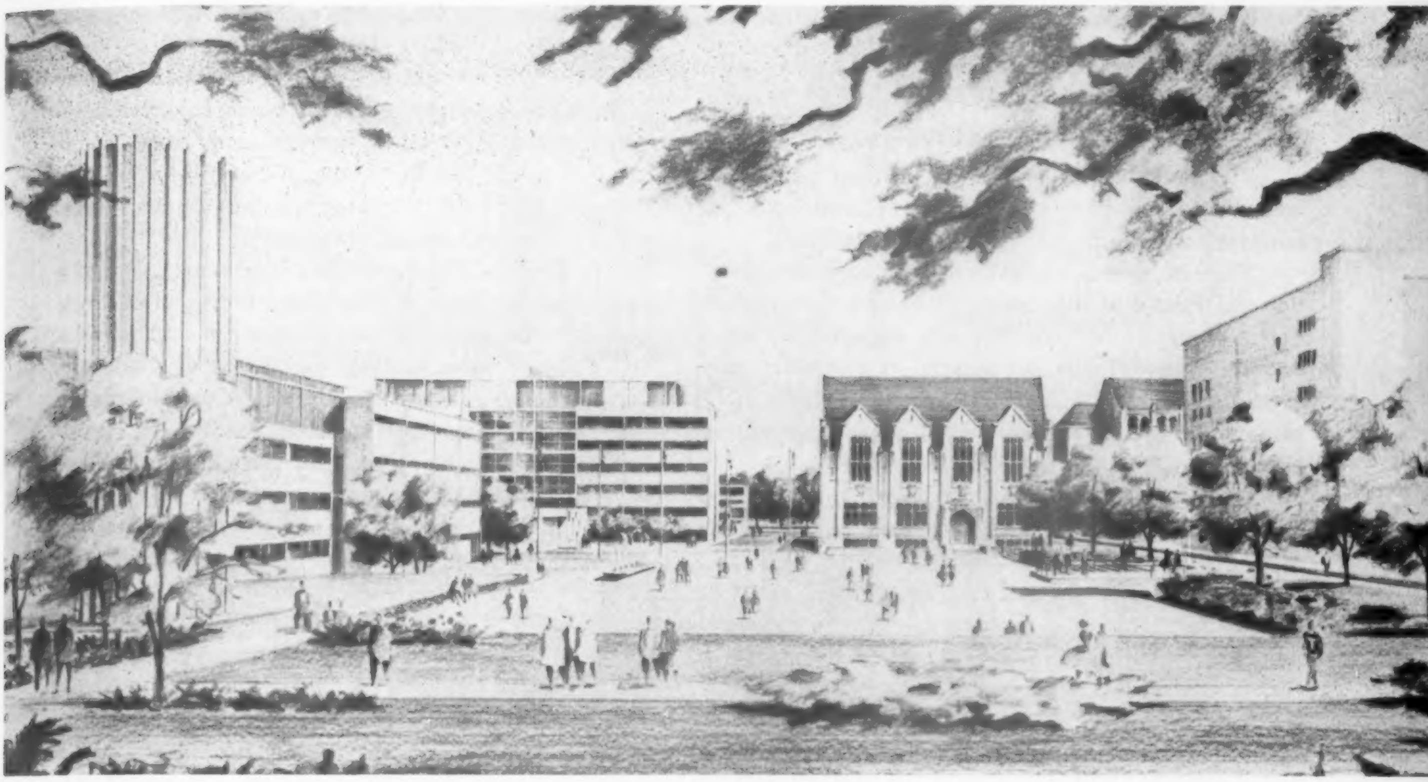
Diagrams of major functional areas of the college, as they existed and as were considered desirable for the future, were made. The result was two alternative campus layouts which were presented for consideration. The choice between the two will depend in great part upon the relative cost of land acquisition under the two proposals. The final decision has not yet been made.

Working Schemes Are Completed

Working schemes have been completed to show the two alternative solutions arrived at by the planners. Under each alternative there was outlined a priority for the acquisition of property and a priority for construction of new buildings and rehabilitation of old ones.

Priority A includes housing for men and women students and faculty, student feeding accommodations and a student center. Priority B includes new academic classrooms and faculty offices, and the elimination of obsolete structures. Priority C includes additional student housing, enlargement of physical education facilities, additional classrooms, and administrative and library spaces. The building construction priorities are the same for the two alternative proposals.

Each proposed scheme is the result of extensive study. Long-range planning for Erskine College means that future enrollment expansion and curriculum and plant facility needs will be anticipated and met with assurance at the proper time. The architectural firm of Lyles, Bissett, Carlisle and Wolff of Columbia, South Carolina, has already been engaged in preparation for the expansion program.



Under the leadership of President Robert L. Johnson, a realistic program for expansion has been developed for Temple University. The overall Master Site Plan was developed by Nolen and Swinburne, architects of Philadelphia.

TEMPLE UNIVERSITY'S MASTER EXPANSION PROGRAM

by HERBERT H. SWINBURNE

Nolen and Swinburne, Architects, Philadelphia, Pennsylvania

Mr. Swinburne received his degree in Architecture at the University of Pennsylvania in 1934. He has been in practice with James A. Nolen, Jr., since 1949. Their office does not specialize in a particular building type, and feels that experience in other buildings has influenced their approach to school and university design.

UNIVERSITIES are at once the custodian of the total accumulated knowledge of man and the vanguard of those forces exploring the intellectual frontier of all knowledge yet to come. The worth of a university can be measured in the degree that it imparts this knowledge to its students, develops their powers of reasoning and judgment and gives them true wisdom in their relations with their brother man. This great accumulation of knowledge and pursuit of wisdom is not a static quality. We suggest that universities, in the development and expansion of their physical plant, apply the same great principles, the same logic and the same modern concepts contained in their curriculum.

In four years, universities can give magnificent courses in philosophy from Aristotle to the present day; but how many have developed their own general philosophy on exactly how a student is to be educated and what physical plant is specifically required to assist and augment this educational process? Universities pride themselves on their great reservoir of knowledge and their intellectual curiosity; but do they always pursue their construction and expansion programs intelligently?

Where Planning Is Needed

Universities give elaborate graduate and undergraduate work in planning—planning for business, for cities, for government, for whole populations; but many have made no plans for the best location of their next building. Universities teach the very latest thinking in arts and in the sciences, and develop the very newest ideas in technologies of countless subjects, but often will not permit their use in their own construction programs.

Too often in planning for the future, many universities follow an expedient solution or remain bound by preconceived ideas. They do not look objectively at their

problems nor apply to them the great imaginative and intellectual solutions they encourage in their curriculum. In short, they do not always practice what they teach.

Broad Aspects of Planning

The architectural firm of Nolen and Swinburne feels that programming and master planning for all university work must be in the following terms:

The end goal to be realized is the superior education and training of all men and all women. Each university in accepting its portion of this responsibility must establish its own limits and develop its own philosophy as to how it will best help in attaining this end. In planning for this educational process the university must examine six important considerations.

1. *People.* This includes the students, faculty and administration who will study and work in the university.

2. *Land.* The physical and social environment of surrounding areas must be considered, as well as the immediate site of the university.

3. *Buildings.* Contemporary structures will embody the most advanced principles in sciences and the arts, and will be designed to serve a flexible educational program without hindrance from preconceived ideas in form or style.

4. *Time.* The long-range aspects of planning look into the future, from 50 to 75 years hence. We see these distinct phases in this projection—phase I, immediate needs of the university; phase II, known future requirements; phase III, unknown future requirements.

5. *Money.* The financial problems of construction and maintenance, of borrowing and amortization require expert advice and careful planning.

6. *Change.* The probability, the inevitability of a future shift in thinking means that the expansion program is to be geared for any revisions or additions.

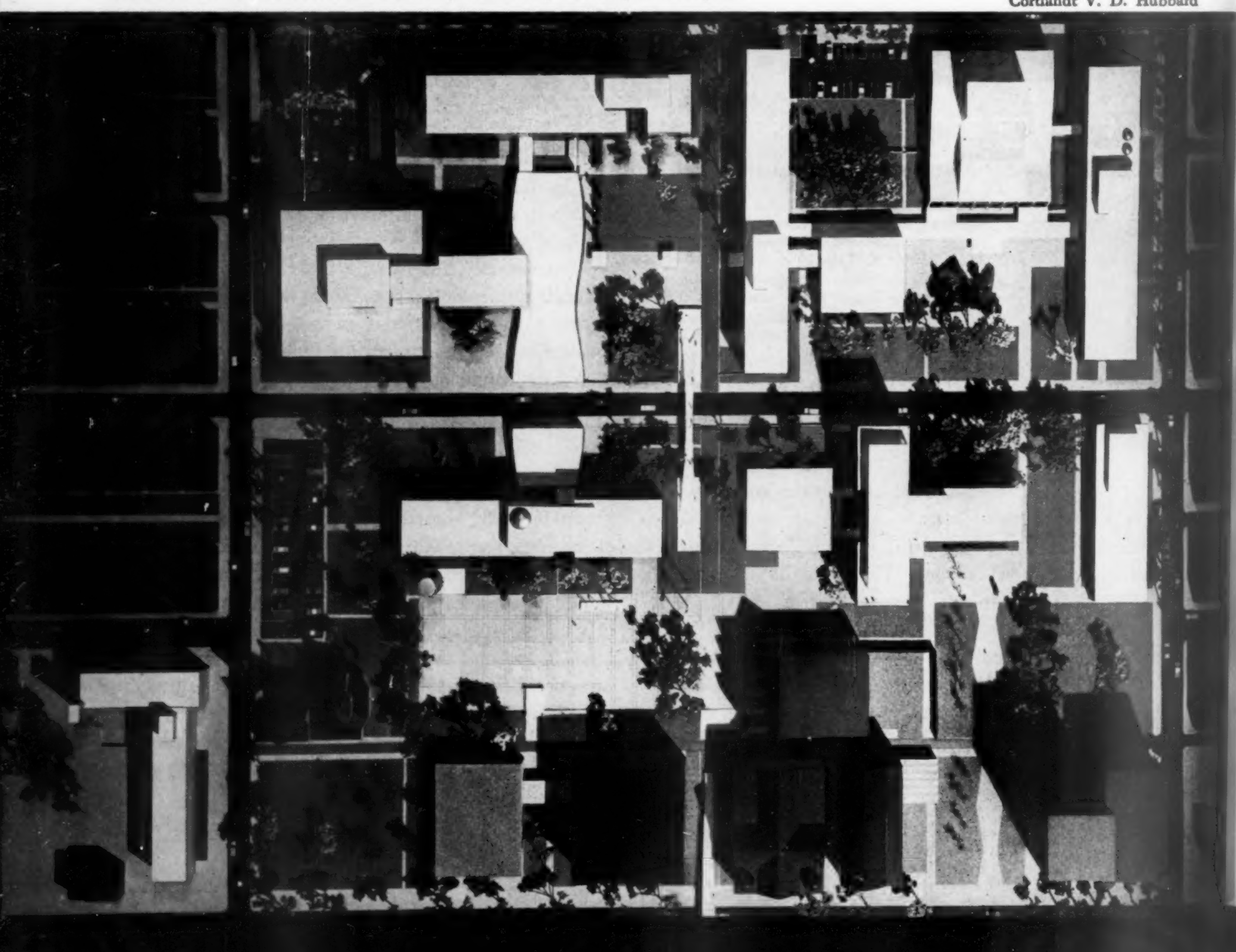
Changes in education, and their accompanying needs, will occur. These changes are not only inevitable, they are desirable; a fixed and static concept of a university is not good. Plans must be versatile, flexible and alive to the fact that in any given period of years the educational process will vary, and so will the educators and administrators.

Temple's Approach to the Problem

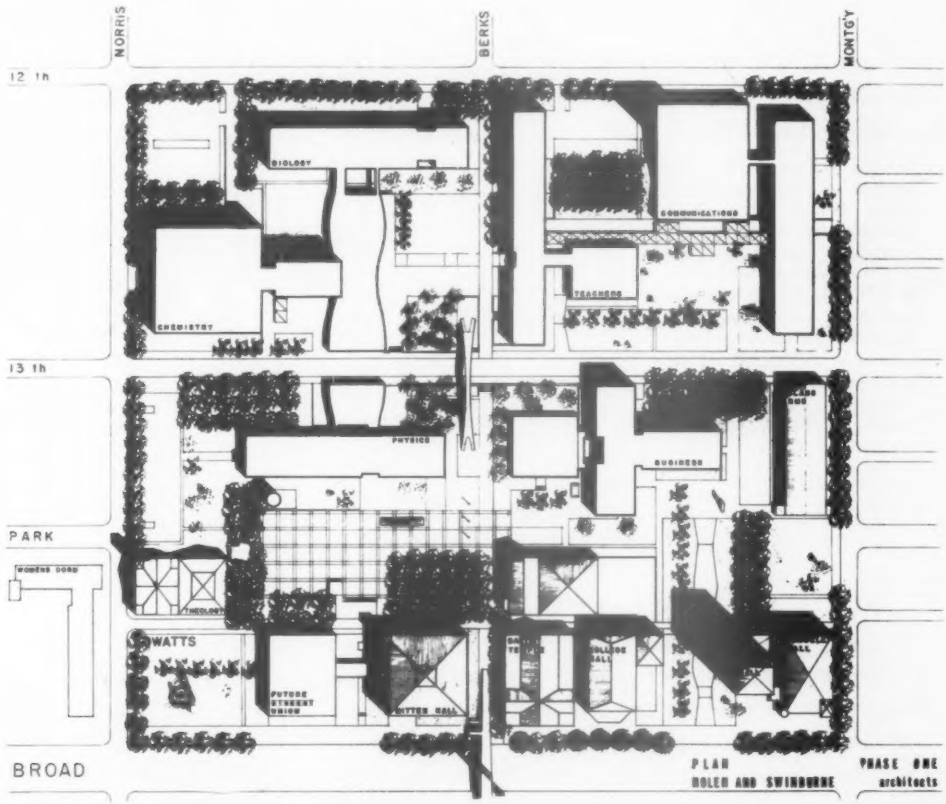
Early in the 1950's Temple University faced up to the fact that it would be confronted with an accelerated enrollment for many years to come. Existing overcrowded facilities were completely inadequate, and if the university was to continue its educational responsibilities to the greater Philadelphia area, it must expand.

Plan view of the model for Phase I of Temple University's Development Program.

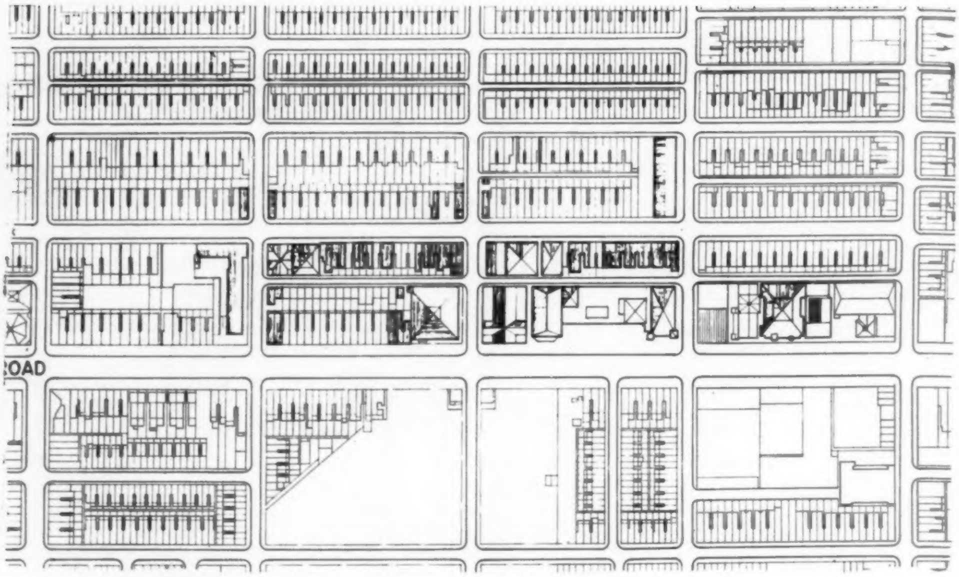
Cortlandt V. D. Hubbard



Phase I will provide the following buildings: Chemistry, Physics, Biology, School of Business, Teachers College and Communications Center.



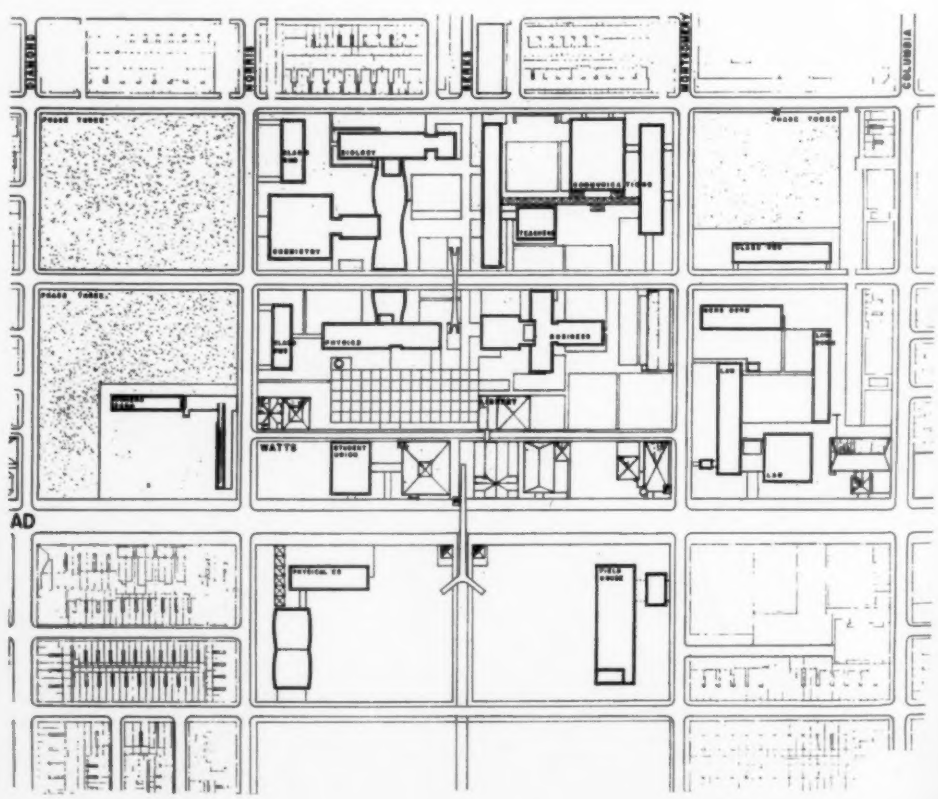
Needed for Phase I of the Development Program are 16 acres of ground, 6 solid city blocks of demolition, 1 mile of sub-surface utility distribution and the elimination of streets. New buildings will total 650,800 square feet of area.



Temple University is now compressed into a ribbon along Broad Street. It is bounded by noise on the west and south; by city blight on the east and north. It is interlaced with streets and high speed traffic. Its student population and faculty are increasing at an accelerating rate. Temple University can no longer remain a ribbon.

Some three million dollars were invested to relieve pressure in the form of a General Classroom Building, a Women's Dormitory and Law School Facilities. Pressure was not relieved, however; increased enrollment flooded these new spaces and pressure was greater than ever. Meeting the total long-range problem of expansion piece by piece, a building at a time was not the answer. Soon there would be a disconnected series of unrelated buildings further confounding the sprawl of the present campus.

Under the leadership of President Robert L. Johnson, Temple University set up a realistic program for expansion that might well serve as a model for many other institutions. He appointed an assistant to the president for Development and a small Physical Plant Steering Committee. These men reflected a balance of interests in education, administration, finance and physical plant. They were brilliant, informed, realistic and tough. They worked tirelessly in the best interests of the university with all that warmness of heart that indicated in the last instance it was the student himself who was receiving the greatest consideration.



For its future, Temple University has developed the urban campus of the 21st century. The center of gravity has shifted to the library. The campus becomes an integral part of the city plan. Blight is gone. Streets have been eliminated; parking is off campus. Expansion is well planned and under control. Expansion has already begun with the addition of the Women's Dormitory and the Classroom Building.

A design contract was signed with our office in 1956 to work with this group. We were asked first to develop on overall Master Site Plan ranging over the next 50 to 75 years; and then to prepare preliminary plans, specifications and cost estimates in great detail for all those buildings immediately needed by the university.

This was no casual approach. Subcommittees were set up for educational programming, for liaison with interested city and state groups, for financing, and for methods and materials of construction. A complete design and report were wanted in five months to be used as a basis for future action. This was completed on schedule. Here are the highlights.

Temple is an urban university located in the heart of Philadelphia astride a great public transportation network. Its educational facilities are primarily available to the city and the greater Philadelphia area, although its enrollment also covers almost every state in the union.

Its convenient location in the center of a great metropolitan area is the real reason behind the need for expansion. As an urban university, with its educational wealth readily available on the bus and subway systems, it is attracting students at a rate of acceleration that is challenging those schools in suburban or remote locations. Its night school opportunities are rivaling those of the day school; expansion problems in both areas are becoming equally pressing.

The People

Temple's doors are open to all men and all women and the cost of education is as inexpensive as possible. Immediate planning is for 10,000 daytime students and an equal number of evening and graduate students. Within 15 years this total figure is projected to a total of 40,000.

The campus at Temple has been historically the hard asphalt of the streets. The expansion program gives first thought to the people of the university—the students, the faculty and the staff—to give them a campus of their own and make them feel they *are* the university. The final solution has a feeling for these people woven through the various courts, open spaces and buildings, and it has a respect for human scale and human use.

Land Considerations

Land costs range up to $400,000 an acre, and use for every square foot of ground must be justified. The immediate social environment of city areas adjacent to the campus are at the bottom of the scale and present real problems of adjustment and up-grading. Temple recognizes that it must do its share in working for a better city and, accordingly, has worked very closely with the City Planning Commission and Redevelopment Authority.

Temple's plans are tied in and integrated with the overall plan for the city's growth and improvement. Close liaison with the city has paid rich dividends in understanding and mutual consideration for each other's problems. Development is real, alive and a working partnership.

Temple is now finding freedom from its compression along Broad Street. Escape from the automobile is now in sight; streets are being erased; off-campus parking is now a reality. Pedestrian overpasses will separate students from high-speed arteries.

Open areas and courts are being created among the buildings and are as carefully studied as the structures themselves. The elements of nature and color and texture and distance are being mixed with the thousands of students in motion on the campus to produce an environment of character. Distinguished illumination will explain and protect a great university working late into every night.

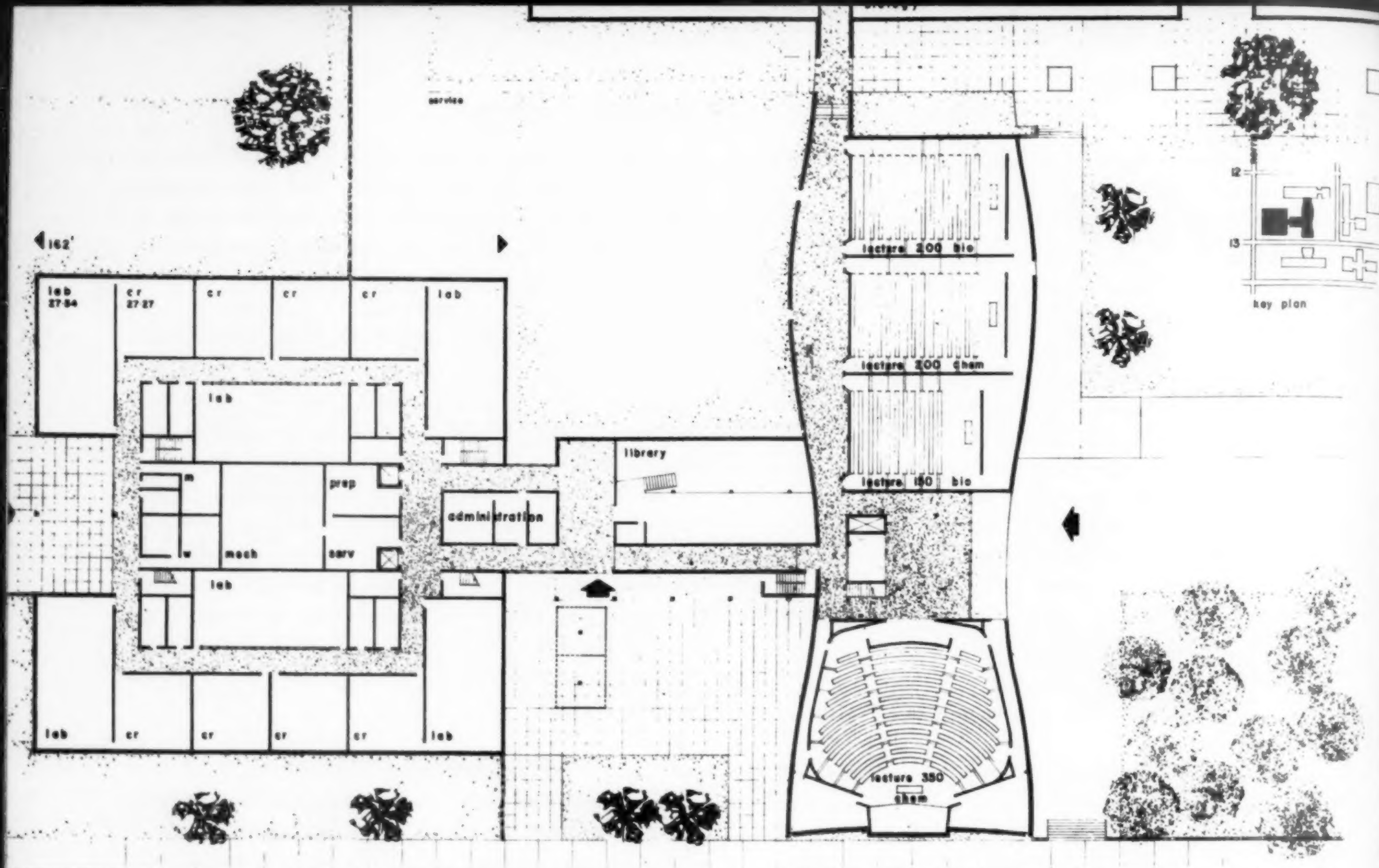
The Campus Buildings

Buildings are related to the existing street patterns in such a way as to permit gradual elimination of all internal streets. Access to public utilities is maintained but spaces formed by the omission of streets will become part of an integrated court design.

The buildings are grouped carefully so they relate properly to each other, to the existing buildings on the campus and to the expansion program beyond the immediate phase.

There are to be no truly departmental buildings.

Total project cost of Phase I, including land, buildings, furnishings, equipment, fees and contingencies, is 25 million dollars.



Classrooms for general university use are to be interspersed through all areas. Students in specialized courses are encouraged to mix with and exchange ideas with students of other interests.

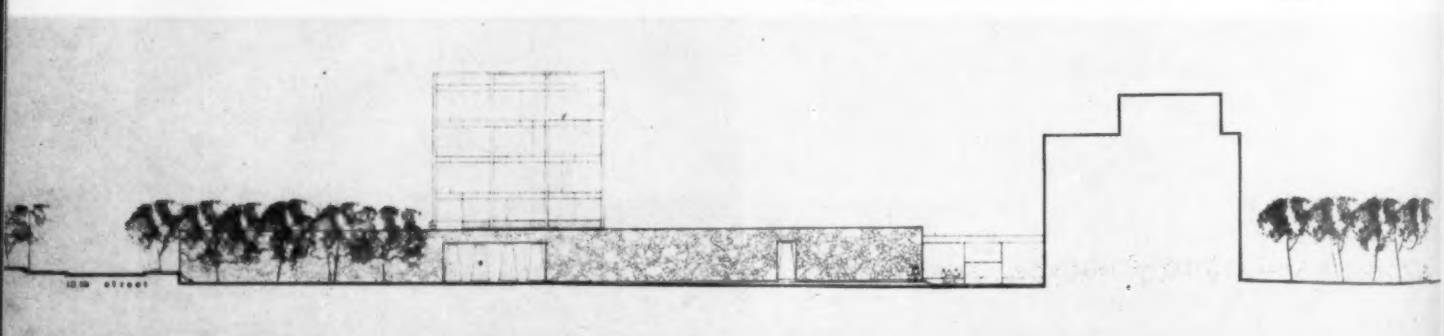
Complete flexibility of space and use within all buildings is preserved by using an overall modular design. Structure, mechanical systems and space design are interrelated on a modular basis. Classrooms can be immediately converted to laboratories with preplanned mechanical services already in position.

All lecture rooms are one story buildings and are separated from classroom and laboratory areas. This eliminates great concentrations of traffic in the academic buildings. Public use of lecture rooms also is possible without intermingling with the students. All classrooms, laboratories and lecture rooms are designed and positioned for intensive, continuous use from 8 A.M. until 10 P.M. Use factors of 75 percent or more are contemplated.

Except for the School of Business, no building has

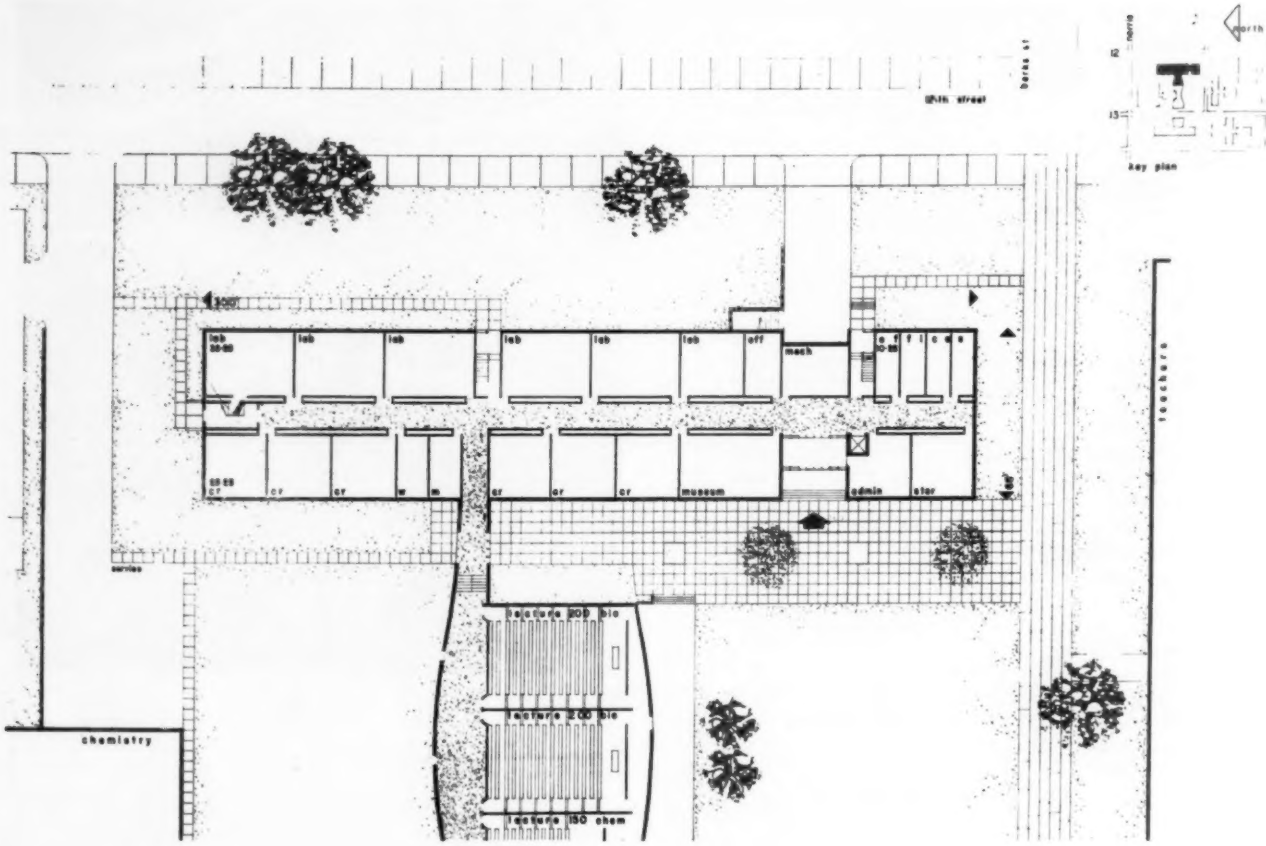
Department of Chemistry requirements, rooms and square feet:

LABORATORIES		
General	6 rooms	8,250 sq. ft.
Qualitative	2 "	2,750 "
Quantitative	4 "	5,840 "
Organic	10 "	14,600 "
Inorganic	2 "	2,190 "
Physical	1 "	1,460 "
CLASSROOMS	36 "	26,280 "
LAB RESEARCH OFFICES	20 "	10,800 "
FACULTY LAB & OFFICE	12 "	3,240 "
GRAD. ASST. OFFICE	4 "	2,160 "
BALANCE ROOMS	11 "	1,782 "
PREPARATION ROOMS	8 "	
INSTRUMENT ROOMS	5 "	2,025 "
SERVICE ROOMS	4 "	1,872 "
GENERAL FACILITIES		
Storage		
Dark Rooms		
Glass Blowing		
Vault		10,900 "
Cold Room		
Receiving and Storage		
Shops (Combined with Biology)		
Administration and Conference		
LECTURE	2 "	6,250 "
LIBRARY	1 "	3,300 "


looking north toward lecture halls

Department of Physics requirements, rooms and square feet:

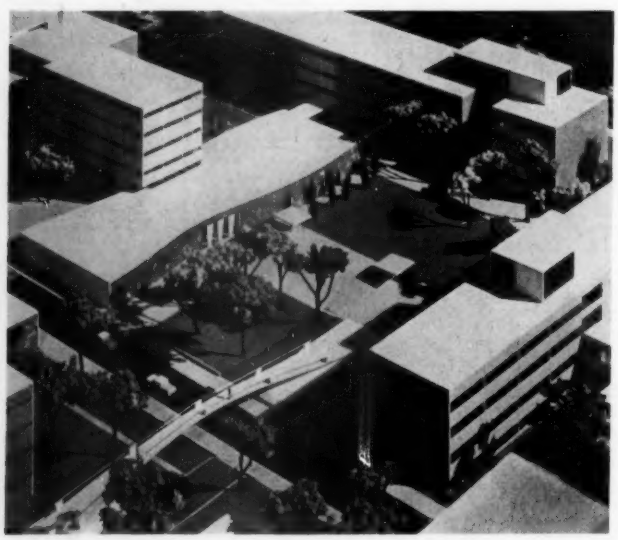
LABORATORIES		
General	4 rooms	3,500 sq. ft.
Heat	1 "	875 "
Electronics	1 "	875 "
Optics	1 "	875 "
Geology	2 "	1,750 "
Physical Science	2 "	1,750 "
Ultrasonic	1 "	875 "
Nuclear	1 "	875 "
Metallurgy	1 "	875 "
Solid State	1 "	875 "
E & M	1 "	875 "
X-Ray	2 "	1,750 "
Research	2 "	1,500 "
CLASSROOMS	21 "	12,250 "
LAB RESEARCH	19 "	7,125 "
FACULTY OFFICE	20 "	2,840 "
GRADUATE ASSISTANT OFFICE	1 "	338 "
ADVANCED RESEARCH LAB	2 "	876 "
SPECTROSCOPY	1 "	1,125 "
FACULTY SHOP	1 "	875 "
CONSTANT TEMPERATURE	1 "	875 "
ANECHOIC ROOM	1 "	875 "
GENERAL		
Shops		
Receiving & Storage		
Preparations		
Dark Room (4)		4,520 "
Specific Storage		
Administration		
LECTURE ROOMS		4,060 "



Department of Biology requirements, rooms and square feet:

LABORATORIES		
General	6 rooms	5,250 sq. ft.
Physiology	2 "	1,750 "
Bacteriology	1 "	875 "
Botany	4 "	3,500 "
Entomology & Zoology	1 "	875 "
Embryology	1 "	875 "
Cystology & Genetics	1 "	875 "
Protozology	1 "	875 "
Histology & Parasitology	1 "	1,750 "
Anatomy	2 "	1,750 "
CLASSROOMS	24 "	15,000 "
OFFICE & RESEARCH	16 "	250 "
RESEARCH SPEC. EQUIP.	3 "	1,125 "

RESEARCH ROOM	3 rooms	1,875 sq. ft.
RESEARCH CUBICLES	7 "	1,029 "
STORAGE—ACTIVE	2 "	2,000 "
STORAGE—DEAD	1 "	1,250 "
GREENHOUSE	1 "	625 "
ANIMAL ROOM	1 "	625 "
GENERAL		
Receiving & Storage		
Prep. & Dishwashing		
Dark Rms.		
Lab Expansion		4,200 "
Incubator (Bact.)		
Distilling & Museum		
Shops (Included in Chemistry)		
LECTURE	2 "	3,800 "



classrooms or laboratories above the fourth floor, thus eliminating student elevators.

All buildings are air-conditioned throughout. This continues the very successful policy initiated by Temple University in new construction in 1956. Intensive summer daytime and evening schedules demand this consideration for students.

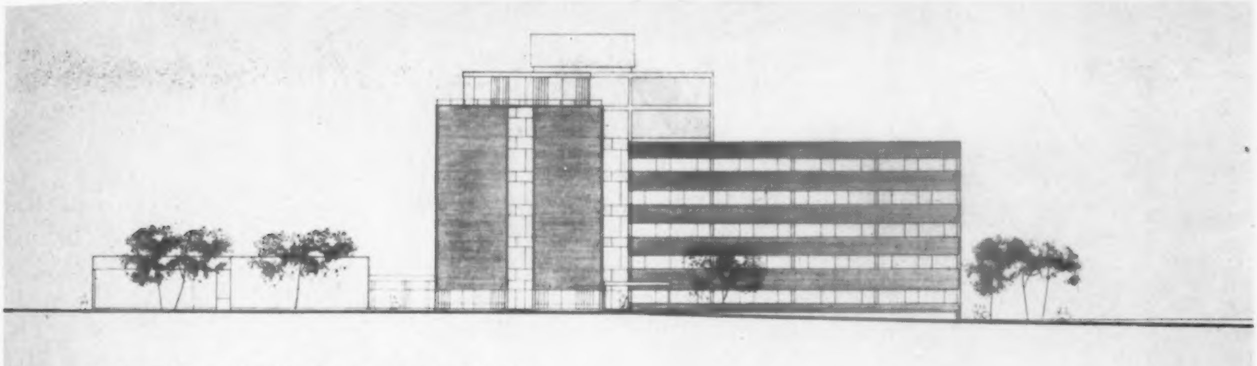
Time Involvements

Temple breaks down its total expansion program as follows, recognizing that the question of established priority of construction may change over the coming years:

Phase I (Immediate)

THE SCIENCE GROUP

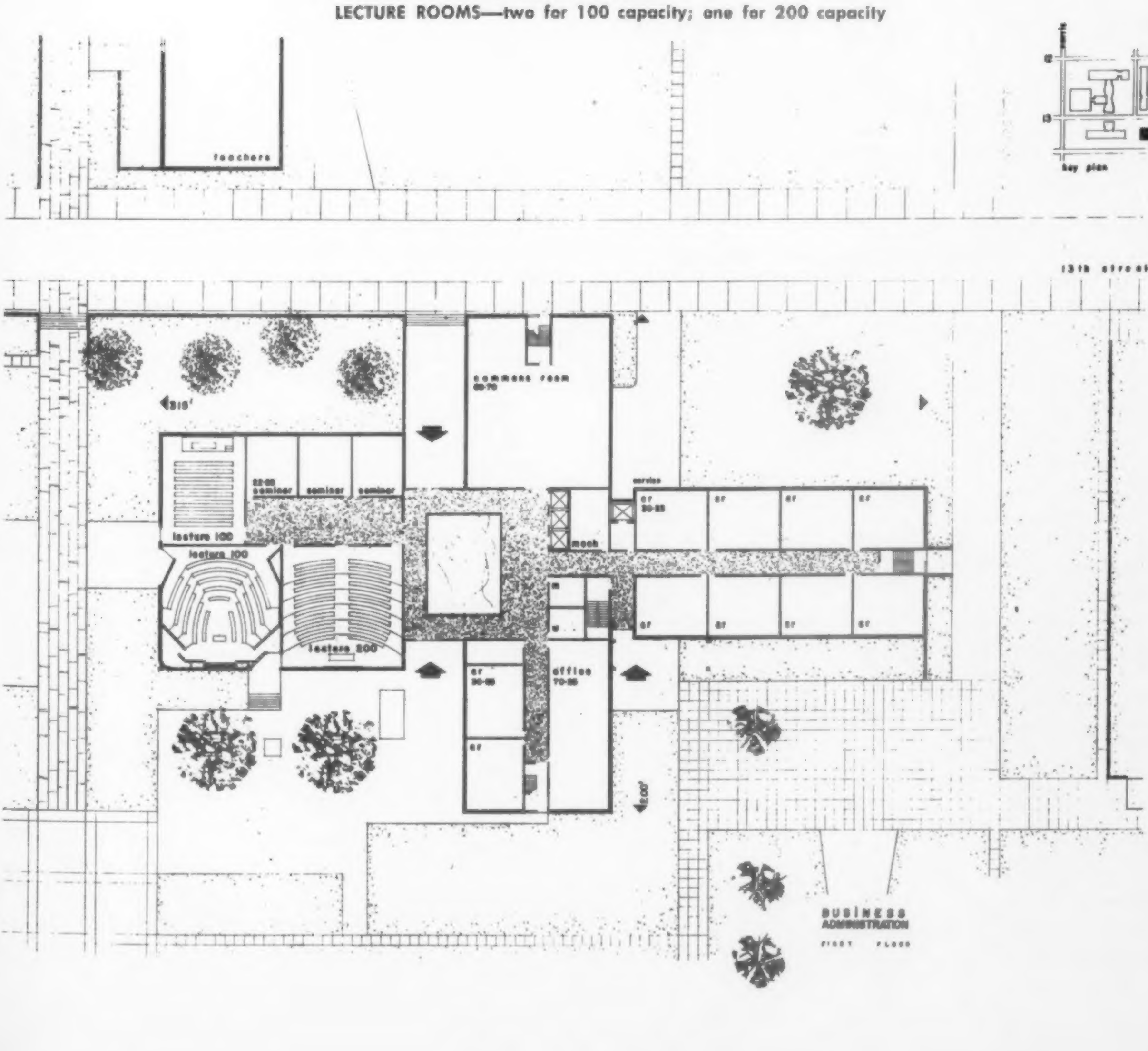
1. Chemistry Building 149,000 square feet

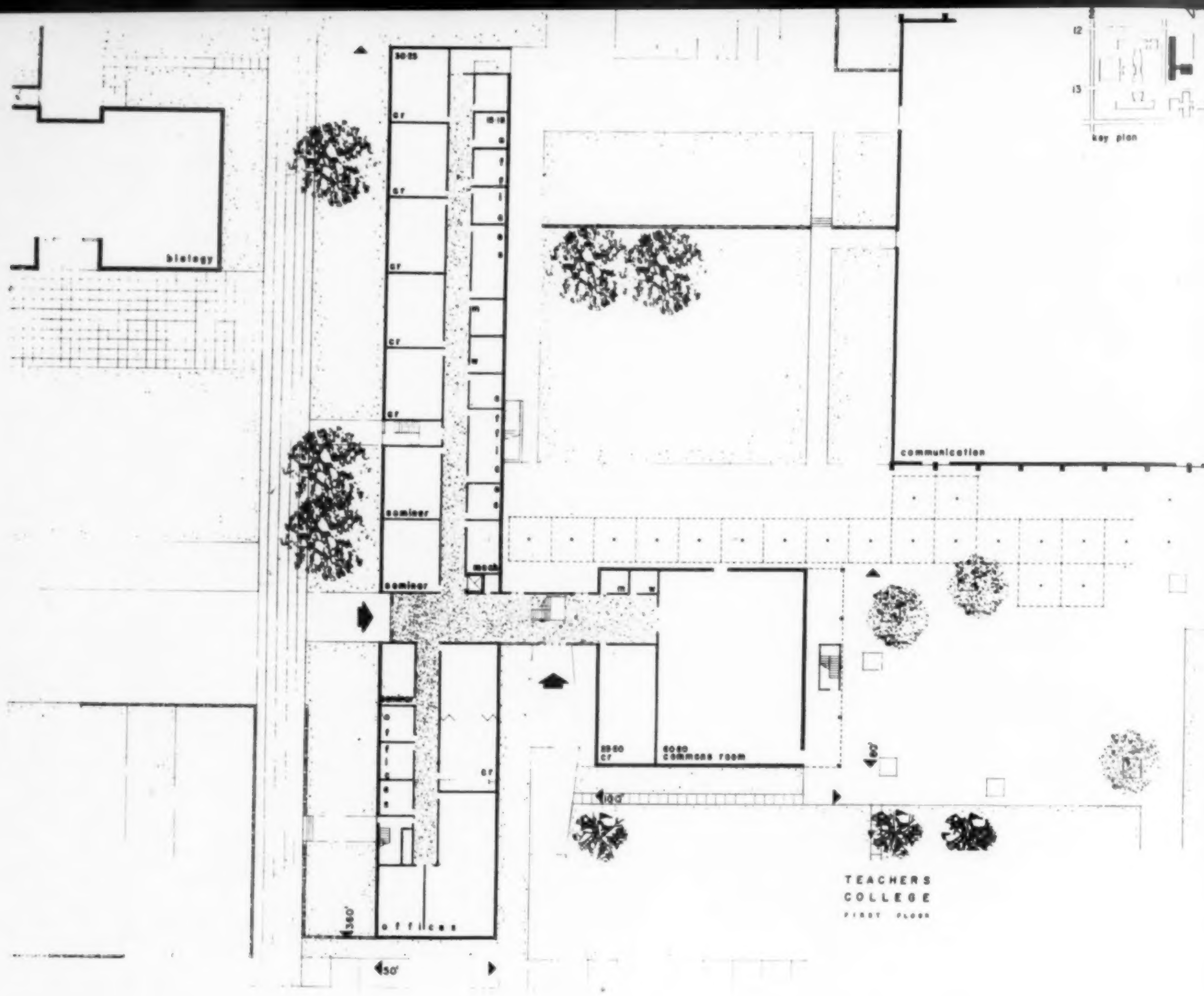


looking east toward business administration

Requirements for the School of Business are as follows:

POLITICAL SCIENCE—5 classrooms @ 750; 2 offices
ACCOUNTING—9 classrooms @ 1500; 1 lab; 2 offices
BUSINESS RESEARCH—1 conference room; 1 office
ECONOMICS—8 classrooms @ 750; 1 seminar; 4 offices
FINANCE—2 classrooms @ 750; 1 office
GRADUATE DIVISION—3 seminar rooms; 1 office
MANAGEMENT—6 classrooms @ 750; 1 lab; 4 offices and storage
MARKETING—7 classrooms @ 750; 1 office
REAL ESTATE & BUSINESS LAW—8 classrooms @ 750; 1 office
SECRETARIAL—2 classrooms @ 750; 2 classrooms @ 1500; 1 office
STATISTICS—3 classrooms @ 1200; 1 lab; 2 offices
DEAN'S OFFICE—COMMONS ROOM
LECTURE ROOMS—two for 100 capacity; one for 200 capacity





Teachers College requirements include:

GENERAL ADMINISTRATION

Dean & asst. deans, 2 rooms; general administration, 1 room; conference and seminar, 1 room.

EARLY CHILDHOOD AND ELEMENTARY EDUCATION

Administration personnel, 1 room; general administration, 1 room; staff office, 12 rooms; general c/r @ 750, 10 rooms; special c/r @ 1300, 1 room; conference & seminar, 1 room.

EVENING ELEMENTARY EDUCATION

Administration personnel, 1 room; general administration, 1 room; staff office, 1 room.

SECONDARY EDUCATION

Administration personnel, 1 room; general administration, 1 room; staff offices, 10 rooms; general c/r @ 750, 5 rooms; special c/r @ 1500, 2 rooms; conference & seminar, 2 rooms.

BUSINESS EDUCATION

Administration personnel, 1 room; general administration, 1 room; staff offices, 2 rooms; general c/r @ 750, 3 rooms; special c/r @ 750, 1 room; conference & seminar, 1 room.

SOCIOLOGY AND ANTHROPOLOGY

Administration personnel, 1 room; general administration, 1 room; staff offices, 7 rooms; general c/r @ 750, 6 rooms; special c/r @ 1500, 1 room.

GROUP DYNAMICS

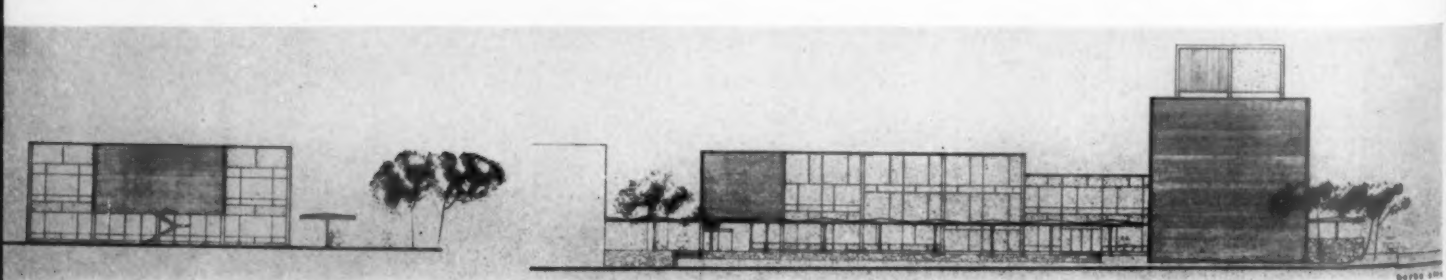
Administration personnel, 1 room; general administration, 1 room; staff offices, 5 rooms; general c/r @ 750, 1 room; special c/r @ 1500, 2 rooms; conference & seminar, 2 rooms.

EDUCATIONAL ADMINISTRATION AND SERVICE BUREAU

Administration personnel, 1 room; general administration, 1 room; staff offices, 2 rooms; general c/r @ 750, 5 rooms; conference & seminar, 1 room.

LIBRARY

STUDENT LOUNGE OR COMMONS ROOM



Requirements for the Communications Center are:

THEATER
Auditorium seating 600; scene and rehearsal shops; costume lab; related spaces, i.e., makeup, etc.; green room; administration.

MUSIC
Soundproof classrooms; band and orchestra room; music library; record library; administration.

RADIO AND TV
Combination radio studio classroom; TV and film laboratory studio; related spaces, i.e., control rooms, etc.; administration.

JOURNALISM
Classroom; news lab; type lab; administration.

STUDENT PUBLICATIONS
Composing room; city room; copy editing; special editors; related spaces, i.e., dark rooms, opaquing rooms, etc.; offices.

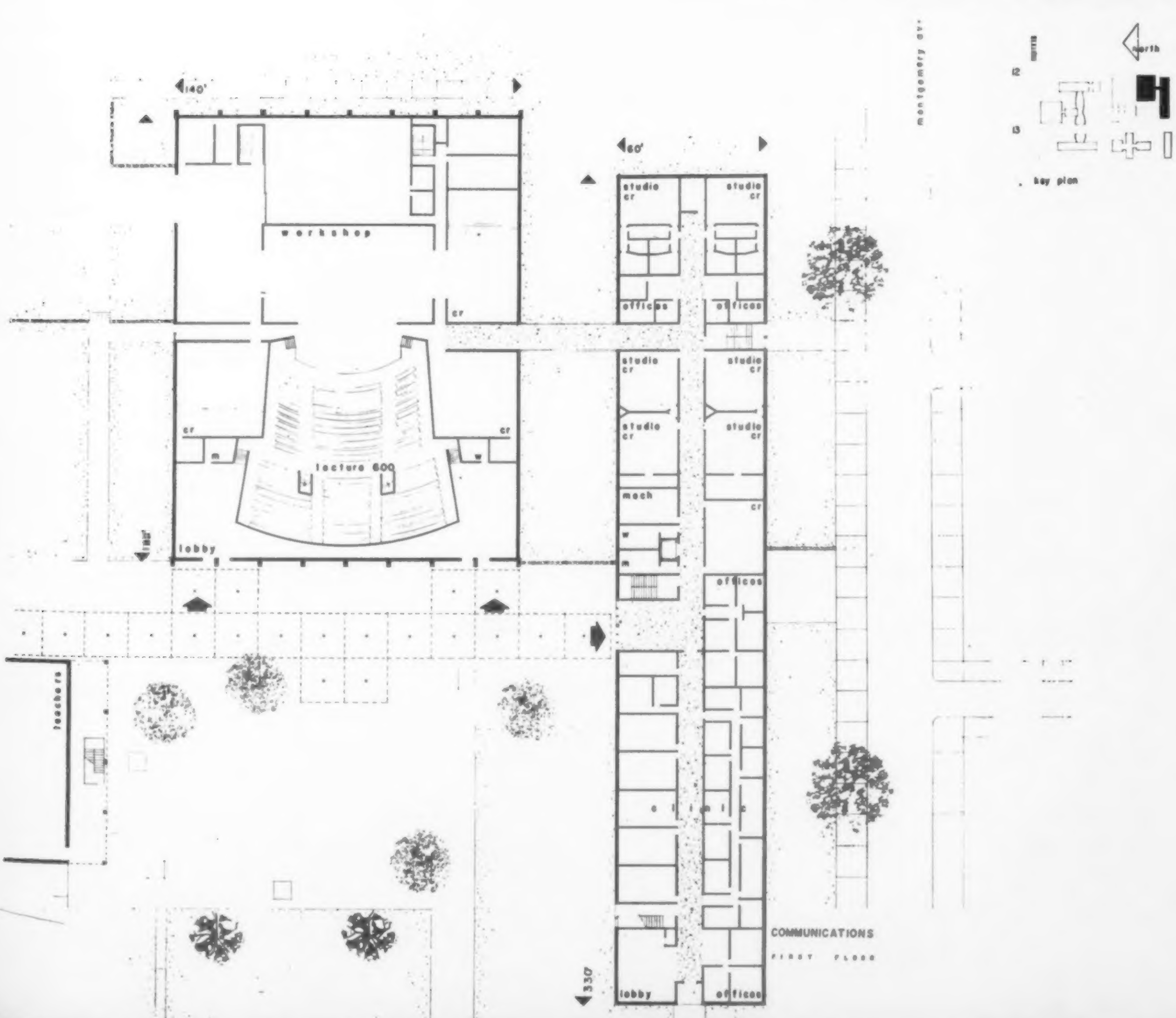
SPEECH
Classrooms; administration.

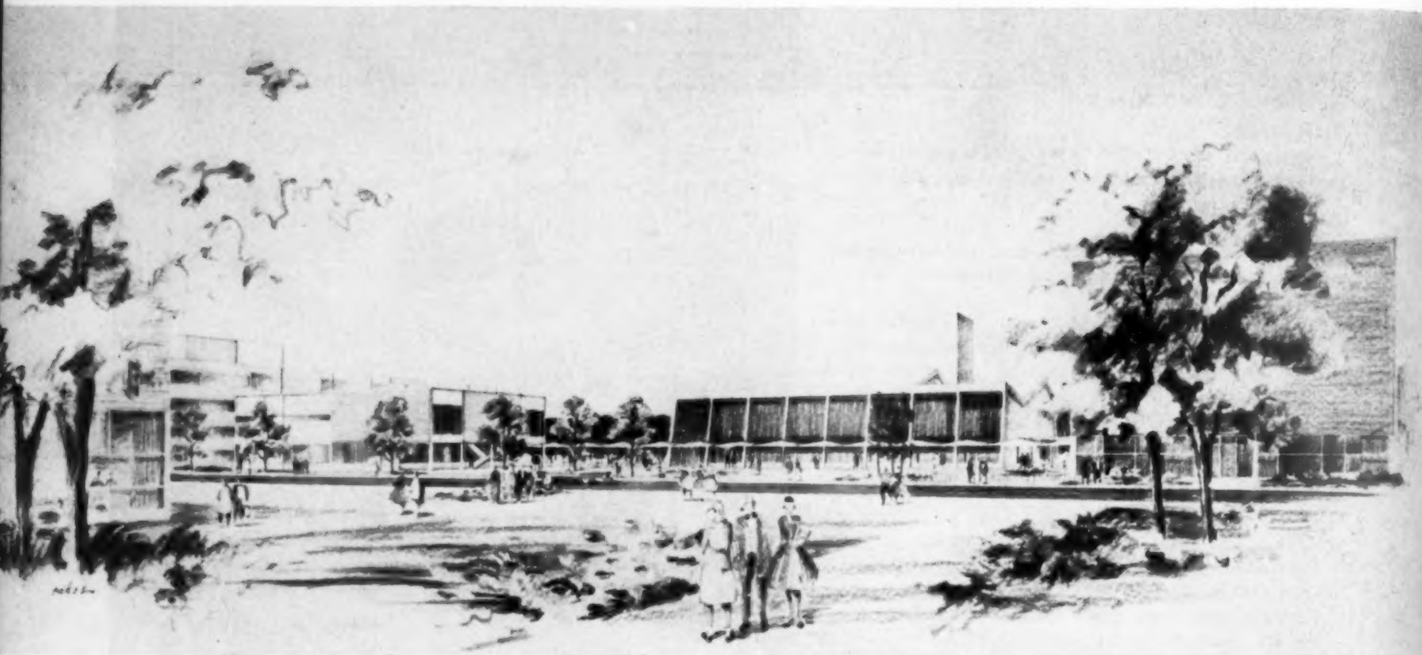
SPEECH CLINIC (OUT PATIENT)
Therapy rooms (15); group therapy (5); hearing testing (2); phonetics lab (1); administration.

AUDIO-VISUAL
Classrooms; storage; graphic, equipment, photographic and dark room labs; administration.

JOINT FACILITIES
Conference rooms; faculty lounge; student lounge.

Cortlandt V. D. Hubbard Photos





Open areas and courts are created among the buildings and are as carefully studied as the structures themselves. Buildings are grouped to relate to each other and to the site as a whole. All buildings will be air-conditioned throughout.

2. Physics Building	81,000	
3. Biology Building	88,000	
SPECIAL FACILITIES GROUP		
4. School of Business	115,000	
5. Teachers College	94,000	
6. Communications Center	123,000	
TOTAL (Square feet)		650,000
Phase II (Known future requirements)		
7. Student Union Addition	70,000 square feet	
8. Physical Education	200,000	
9. Men's Dormitory	75,000	
10. Library Addition	60,000	
11. Law School	60,000	
12. Additional Classrooms	150,000	
13. Women's Dorm. Addition	30,000	
14. Power Plant Addition	10,000	
TOTAL (Square feet)		655,000

Phase III (Unknown future requirements)

15. Twelve acres of ground reserved for expansion.

Money in the Millions

The total project cost of Phase I, including land, buildings, furnishings, equipment, fees and contingencies, is $25,000,000. Phase II will be approximately the same, bringing the total known required expenditure over the next 15 year period to $50,000,000.

In any long-range program such as this, it must be kept in mind that building prices vary widely from year to year. Between 1946 and 1956 the index of building prices doubled. This is an average increase of 10 percent per year for the past ten years.

The costs of the development program were based on the cost of construction for June, 1957. Construction costs, if they continue the trend of the past several years, can be expected to increase substantially. For each year this program is delayed beyond 1957, funds required for its completion must be increased accordingly.

Aspects of Change

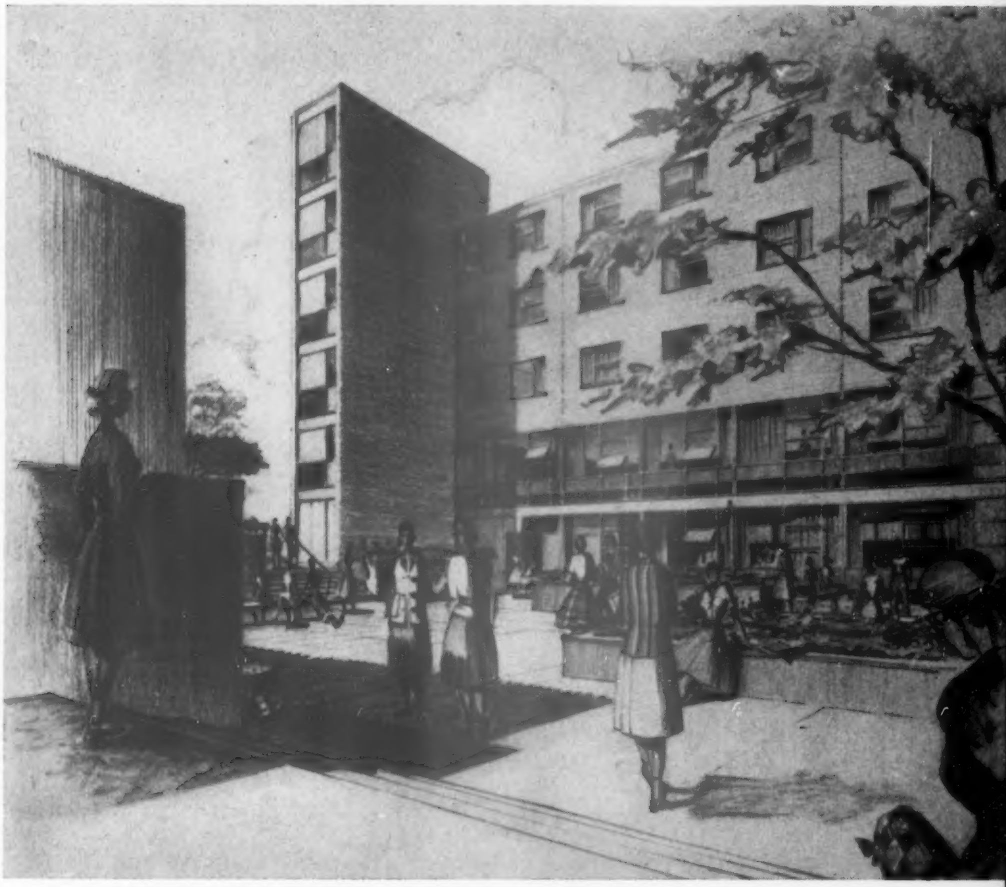
All those who have worked on this program expect it to change. The educational program, as projected, and the physical plant required to house it are the product of all those forces in effect at that point in time called 1957. As time progresses it will bring change. Temple University is ready for this and expects that any change made will be for the better.

Outline Specifications

Site. The entire area must be cleared of existing slum housing units. Streets shall be removed and existing public utilities protected. Grading, site preparation and landscaping requirements shall be executed in sympathy with the recommendations of the City Planning Commission.

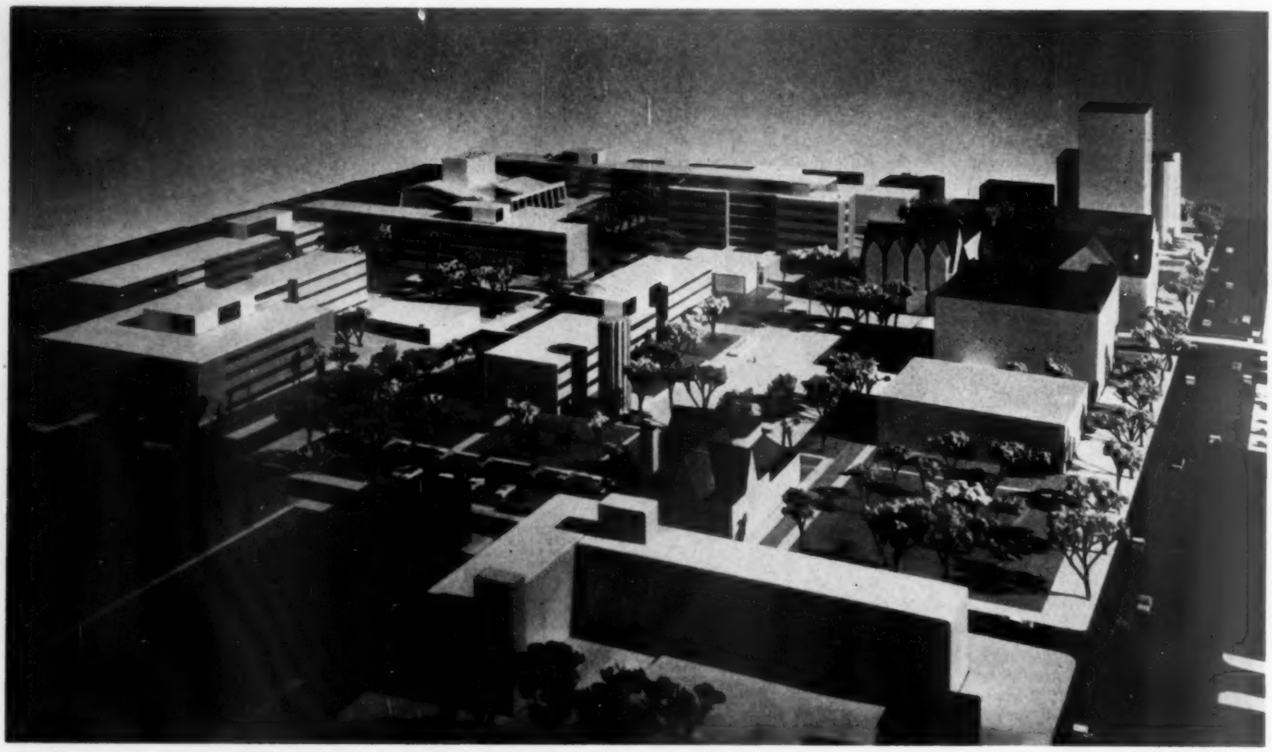
Structural Frame. The structure of all buildings shall be reinforced concrete with flat plate floor systems.

Exterior Materials. Selected materials shall be durable for at least 75 years. They shall be easily maintained and give character to the building. Quality in design shall be achieved without resort to embellishment or ornate details. The fabric of the exterior, as it is conceived in brick, stone, glass and metal, weaves a



The Women's dormitory was completed and ready for occupancy in the fall of 1957. It provides complete facilities for 300 students.

The Classroom Building was completed in 1956 and handles 2,000 students from eight in the morning until ten at night, on a full year's schedule. The boiler room and air-conditioning plant are located on the roof. All sound is completely isolated and does not penetrate into the four classrooms immediately below these service units.



Temple University's plans for expansion tie in and are integrated with the overall plan for the city of Philadelphia's growth and improvement. Understanding and mutual consideration for each other's problems have resulted from this close liaison.

constant pattern across the face of the several buildings. This pattern and the expression of its relation to the structural frame that supports it will create the total composition.

Interior Materials. Interior materials shall first be selected for their durability; all visible wearing surfaces shall be easily and inexpensively maintained.

The use of a space and its relation to other spaces shall be made to come alive with materials chosen for color and texture. They shall be put together in a way that will create an environment in which it is a real delight to study and to work.

Plumbing. Plumbing design and construction shall follow routine standards of good practice. Special emphasis will be placed on site drainage and accessibility to public utilities traversing the site.

Heating. High pressure steam available at the university's Central Plant will be extended to all buildings. Converters and pumps will provide forced hot water systems in each building operating under zone controls. All essential piping shall be exposed to view and accessible for repair.

Ventilating and Air Conditioning. All buildings shall be air-conditioned the year round. Cooling and heating systems shall have proper amounts of fresh air added at all times. Building design, shape and minimum glass areas have greatly reduced the cost in air cooling.

Particular consideration will be given to laboratory exhaust systems in the science buildings.

Special Mechanical. The science buildings will require special piping for gas, compressed air, high pressure steam, distilled and demineralized water, and other special purpose fluids and gases.

Electrical. From the substations in each building, routine power and lighting distribution systems shall feed all panel boards with ample allowance made for future expansion requirements.

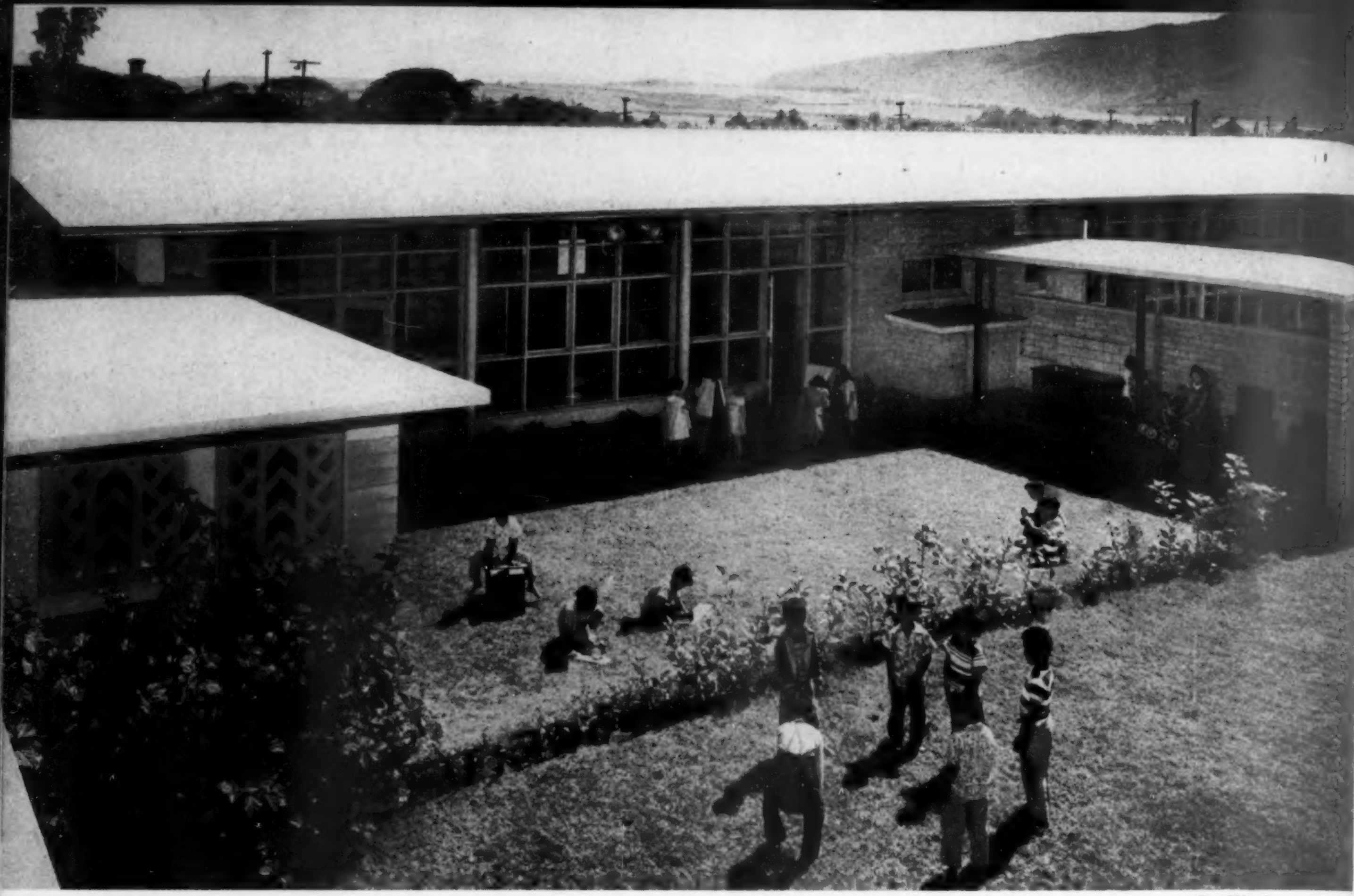
Design levels of illumination shall range from 30 to 50 foot-candles. In general, lighting shall be fluorescent in laboratories and classrooms; incandescent elsewhere.

Emergency lighting, fire alarm, time and program, telephone and closed-circuit television systems will be designed using the most advanced technologies. Special consideration will be given to stage lighting and radio and television studio requirements.

SCHOOL BUILDINGS FOR TODAY AND TOMORROW

WE NEVER FAIL TO RECOGNIZE a school plant constructed during the first decades of this century for what it is—an outmoded structure, ill-fitted for today's educational programs, a detriment to the health and well-being of the students and teachers who must teach and learn within its walls. In contrast, fifty years from now, we hope that the school plants now rising will still be in use, will still be adaptable to whatever educational program is in progress, and that they will never cease to serve the whole community.

Our new school buildings, then, are designed for today, and for tomorrow, too. Several recent elementary and secondary schools are presented here. Remember, in studying them, that while they were planned for service now, they will also be serving future generations. Will they stand the test of time?



R. Wenkam

Kindergarten classrooms of the Waialua Elementary School have an exterior covered toy storage space and sheltered outdoor play area. Architects and engineers of the school are Law & Wilson.

SCHOOL PLANT CRISIS IN HAWAII

by HENRY S. NAKATA

Deputy Superintendent, Department of Public Instruction, Honolulu, Hawaii

Henry S. Nakata was educated in the public schools of Hawaii and received his Ed.B. degree at the University of Hawaii. He has been an employee of the Department of Public Instruction for the past 22 years. He has served as a teacher, principal of five different schools, including elementary and high, and was assistant district superintendent from 1949 to 1952. He has held his present post since 1952.

SINCE the end of World War II, Hawaii has been spending an average of $5,000,000 a year for new school construction. This volume of construction is primarily confined to two school districts, Honolulu and Rural Oahu, both of which are in the City and County of Honolulu.

School building facilities are, like the national pattern, in arrears of the actual need. There was little or no construction before and during the war years. School population has been increasing at the rate of 5,000 pupils a year. In 1949 there were 90,000 pupils in the public schools. Today there are 130,400, and it is estimated that by 1962 there will be 154,500 students in the schools.

The Territory of Hawaii has a "state" system of education with a single board of education (Commissioners of Public Instruction). The Territorial Department of Public Instruction is the operating and administering agency for the instructional program in all matters pertaining to education in the Territory ex-

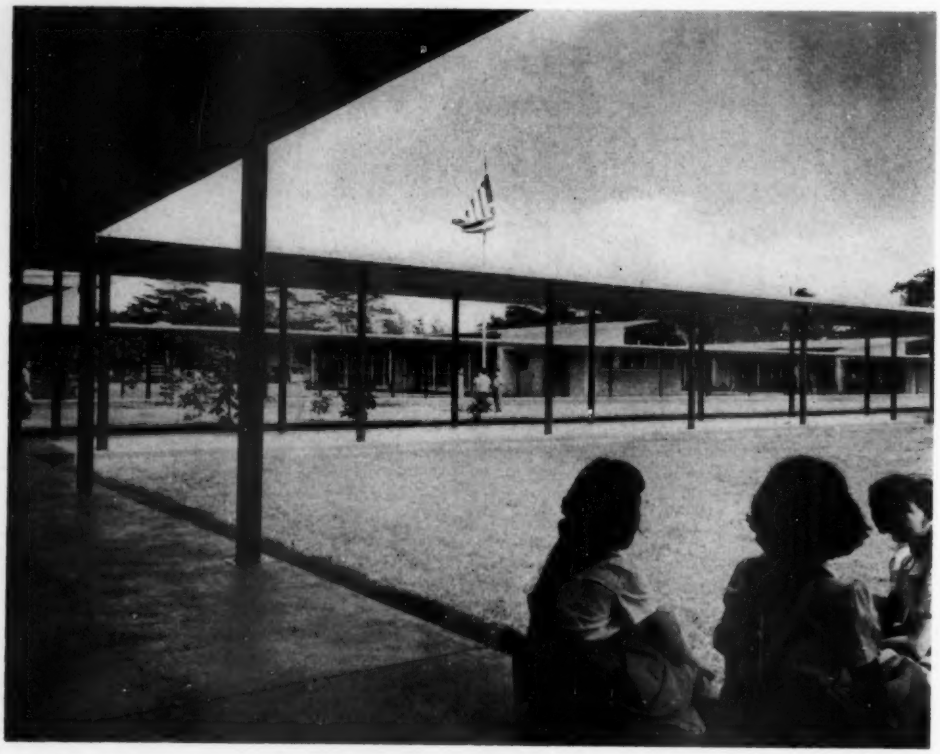
Classrooms of the Waialua Elementary School have a wall of glass and two doors which lead directly to the out-of-doors.

cept construction, operation and maintenance of school building facilities.

The responsibility for school buildings lies with the four counties, each of which constitutes a school district, except that the City and County of Honolulu has two districts. School buildings constructed by the counties, however, are subject to the approval of the Department of Public Instruction in such areas as size, arrangement, dimensions, lighting, sanitation and safety.

In 1951 the Department of Public Instruction

Central mall area of the Waialua School is especially popular during Aloha Week and May Day celebrations. Covered passageway serves all classroom units and will be extended to reach the future cafetorium and administration buildings.



Waialua Elementary School was designed by the firm of Law & Wilson, architects and engineers, with an openness of the plant, emphasized by the central mall.

R. Wenkam Photos

Classroom buildings of Waialua School form a background for the spacious play area which is part of the school site.

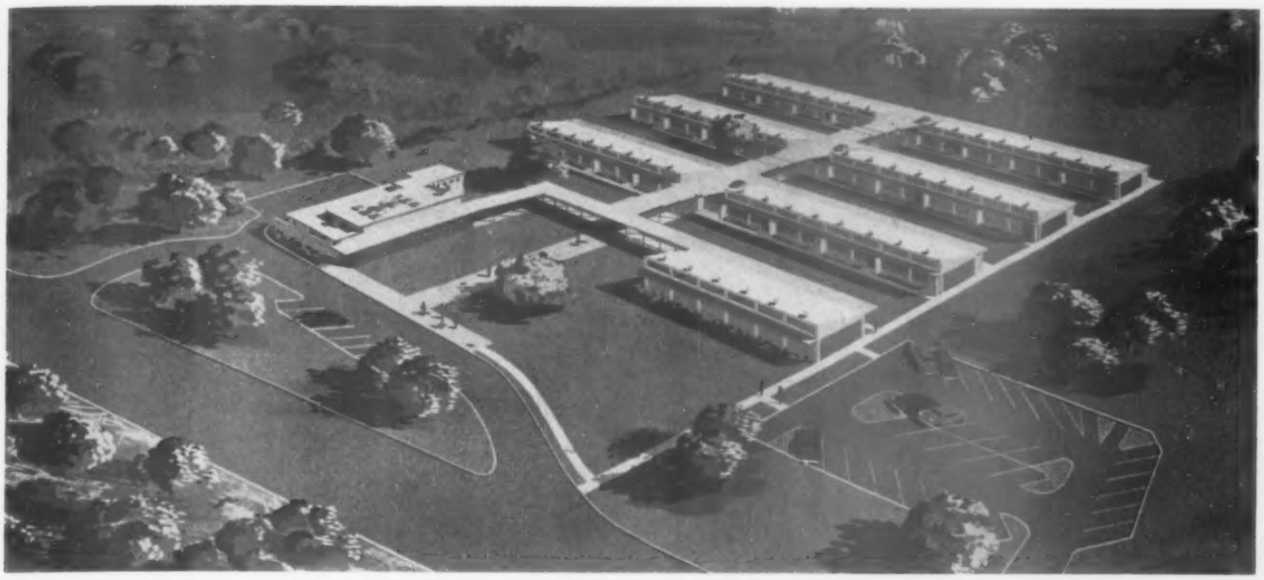
added to its staff a director of school building services (subsequently changed to deputy superintendent) to assist with the construction of urgently needed school facilities, and to administer the requirements called for by Public Law 815 passed by the Eighty-First Congress of the United States relative to a survey of school building facilities and applications for federal assistance in school construction. Since its establishment, this office has coordinated the planning of more than forty million dollars of new school construction, financed by local and federal funds.

In each of the four district offices an assistant district superintendent was added to the district staff to assist particularly in the area of operation and maintenance of physical plants in the district. This officer works closely with the county and the deputy superintendent of the territorial office in matters pertaining to site selection and planning of new school facilities.

The School Building Guide

A School Building Guide was adopted by the Commissioners of Public Instruction in 1954. This guide establishes minimum standards relative to the size of sites, classrooms and auxiliary facilities. The minimum area of a regular classroom is 960 square feet for both elementary and secondary schools.

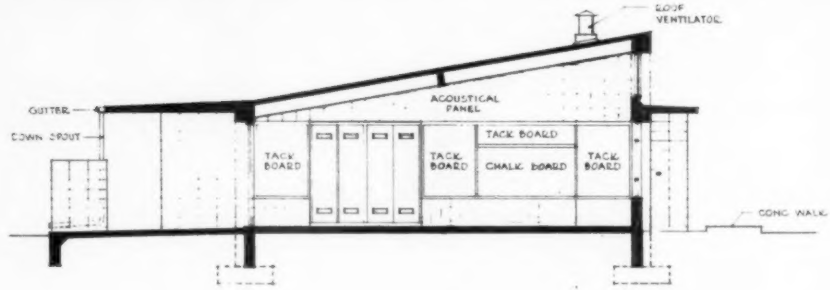
Besides specifying spatial allocations for proposed school facilities, the guide set up an administrative procedure which spelled out the responsibilities of the county, district and territorial offices in the planning of new schools. The value of the guide has been pointed out by all those concerned with providing adequate



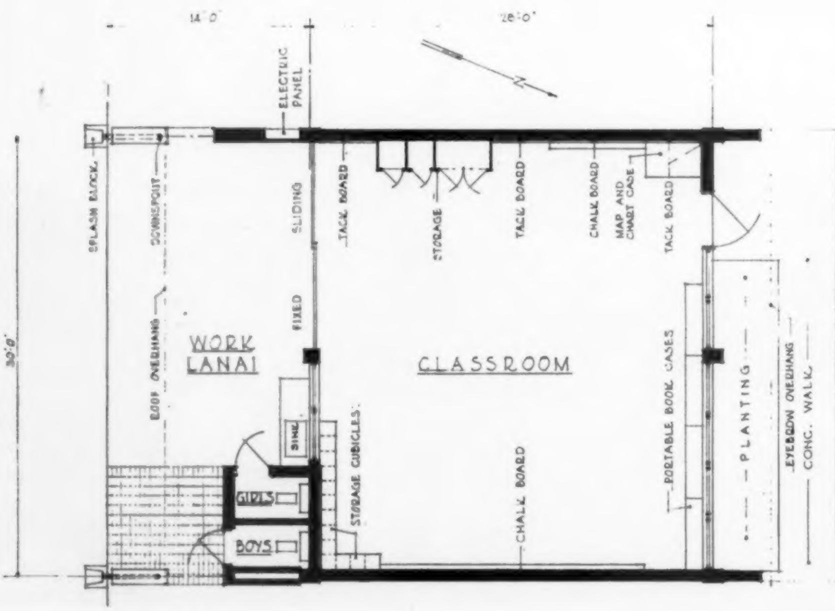
Kaewai School, also designed by Law & Wilson, is a finger plan of classrooms, supplemented by the cafetorium and the administration building in the center foreground (above). Classroom units are connected by short covered passageways (see right). Each classroom has a lanai or outdoor area. View below is of the administration unit of the Kaewai School, with the cafetorium building in the background.

Williams Photography

Administration building of the Kaewai School includes a health clinic. The entrance to the clinic may be reached directly from the student areas.

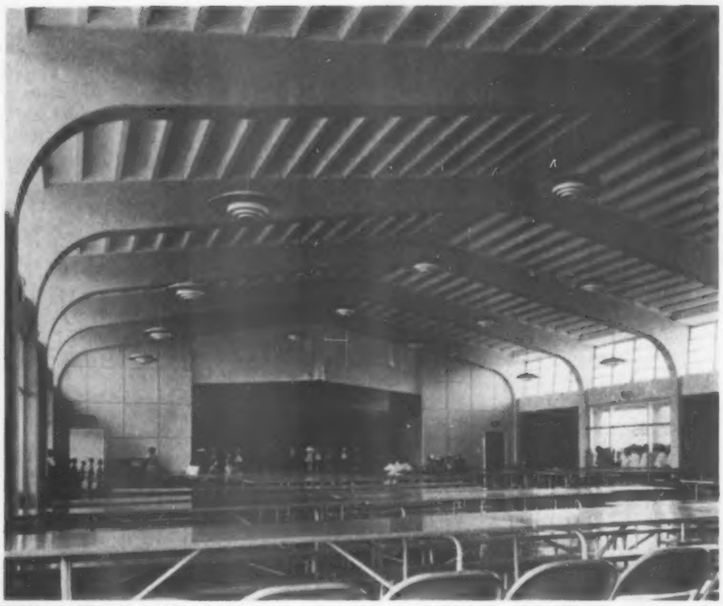


Classrooms have roof ventilators, clerestory lighting and roof overhangs for the outdoor areas, see cross section at right.



Elementary classroom plan of the Kaewai School includes a work lanai, individual toilets and integral storage, chalk and tackboard facilities. Each room has its own planting area.

The Moanalua Ridge School has 40 classrooms, a cafetorium, administration unit and a library. The school was designed by Law & Wilson, architects and engineers, and Lou E. Davis and Philip C. Fisk.



Williams Photography

Cafetorium of the Moanalua Ridge Elementary School, located in Moanalua, Honolulu, has a concrete rigid frame construction with pan joists.

school facilities for our children, especially when we are faced with an unprecedented era of new school construction.

Buildings Are Evaluated

Recently the superintendent of public instruction organized a special committee to evaluate the School Building Guide by determining the adequacy of school facilities built since the guide has been in use. With the aid of the director of the Stanford University School Building Laboratory, the committee formulated a set of criteria. These criteria were used in appraising several elementary and secondary schools built according to the minimum standards.

Adjustments Will Be Made

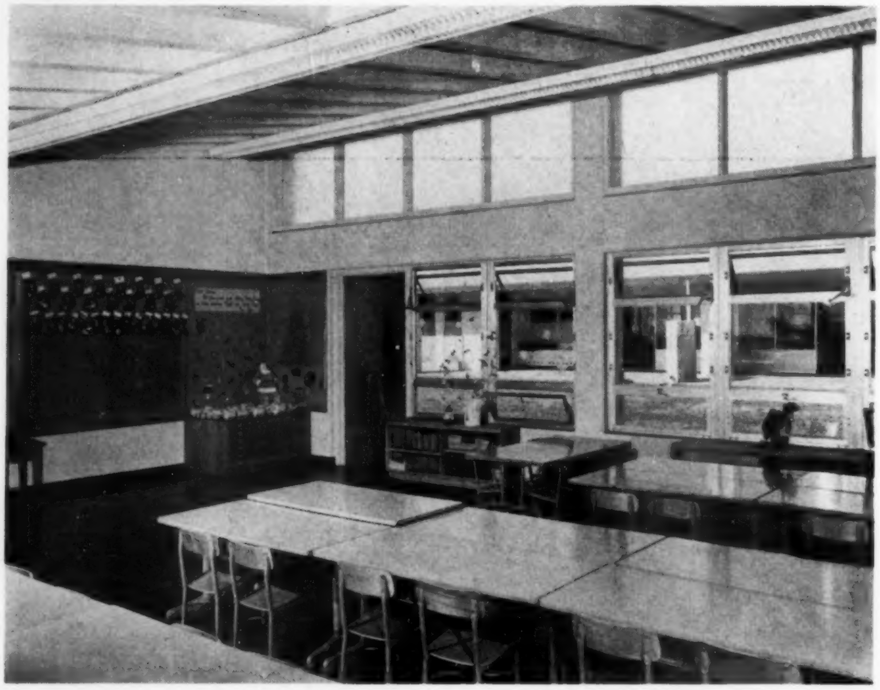
Although the work of this committee is not as yet completed, there are indications that adjustments will be made in increasing or decreasing the existing standards. Every consideration is being given to educational requirements of the present and future, so far as current practices indicate.

Except for one school district where the earthquake problem is a constant threat, Class A or B type construction is the prevailing standard. Experience has shown that it is more economical to build school facilities that require less maintenance. Furthermore, the county building ordinance specifies Class A type of construction for all multi-story school buildings.

New School Recommendations

Single-story classroom buildings are recommended for an elementary school built on a ten acre site to house a maximum of 1,000 pupils. However, when adequate size sites are not available, two-story units are being built. Kindergarten and primary grades occupy the first floor and upper grades the second floor.

Secondary school plants of two-story units are built to accommodate 1,500 junior high pupils on a fifteen acre site, and 2,000 senior high pupils on a thirty acre



Classrooms of the Moanalua Ridge Elementary School have lanais for outdoor projects. Ample window area insures bright and cheerful interiors.

Administration building, at left, and cafetorium of the Moanalua Ridge School constitute the main approach to the school. Classroom units stretch out behind these units.

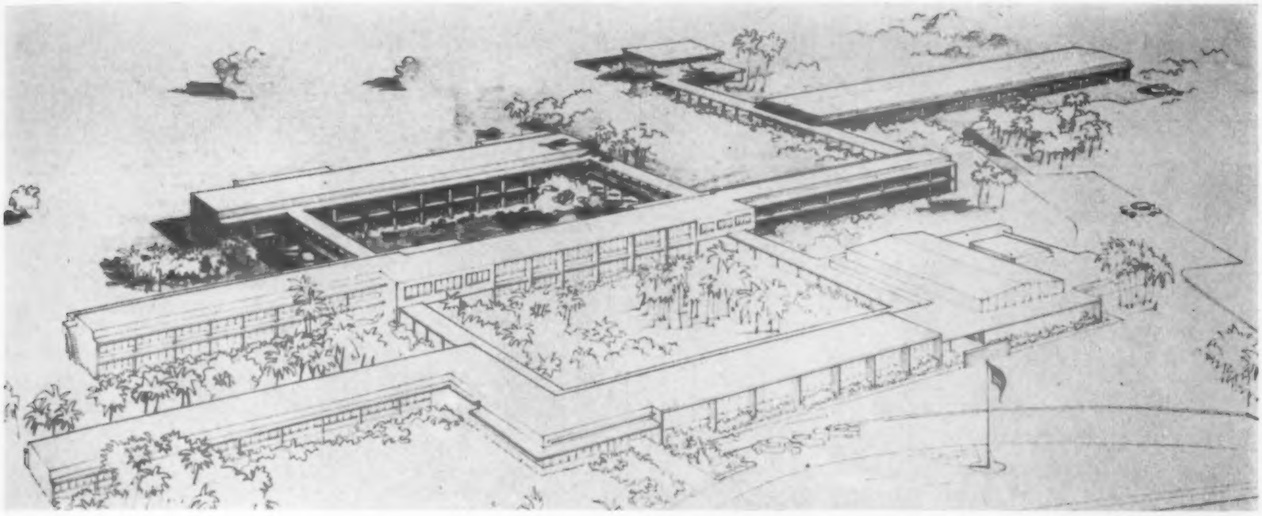
site. Adjustment as to size of site is considered when schools are built adjoining public parks or playgrounds.

Coordinated School Planning

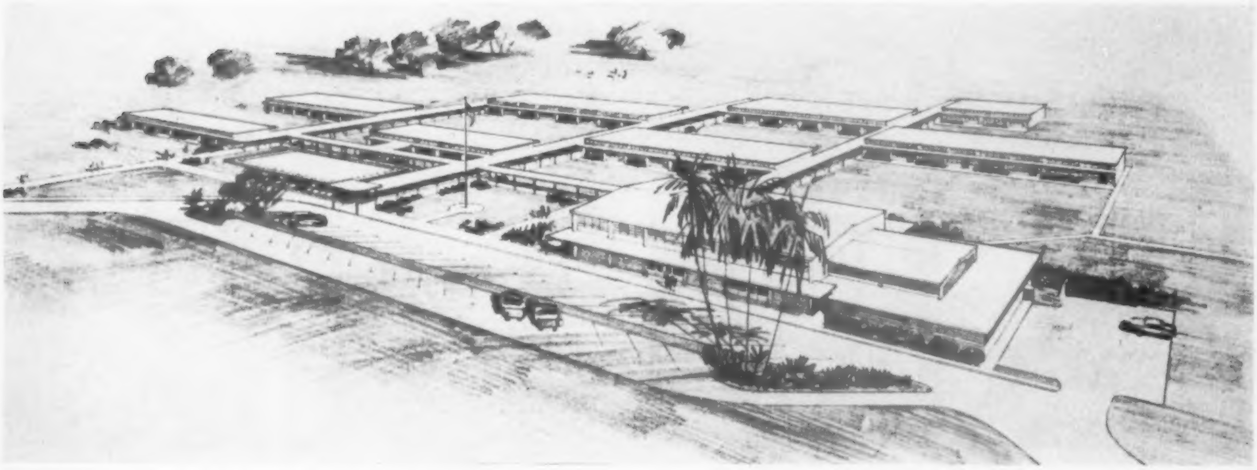
With the scarcity of adequate school sites and the urgent need for better utilization of our school buildings and playgrounds, more and more schools are being planned in conjunction with the construction of public parks and playgrounds. The coordinated planning not only results in economy, but in better and more convenient facilities for the general public, primarily because of the centralized location within the school attendance area.

In master planning our schools, major emphasis is placed on north orientation of all buildings with multilateral lighting. This arrangement makes it possible to take maximum advantage of our Hawaiian climate. Indoor-outdoor coordinated educational areas, especially for the elementary schools with single-story units, afford a better setting for a well rounded educational program.

A moratorium has been placed on the construction of auditoriums, gymnasiums and swimming pools for the

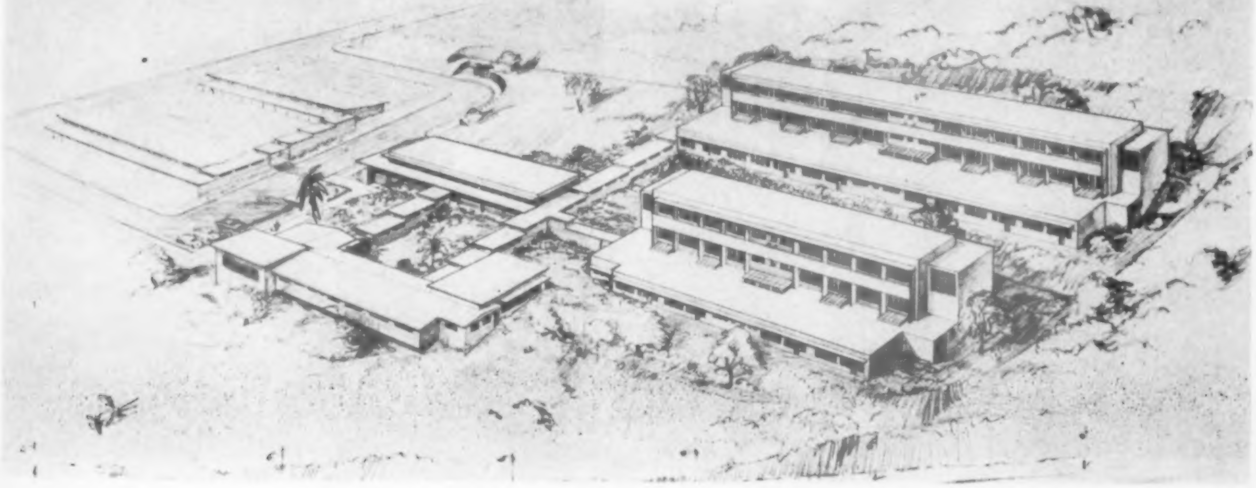


New construction planned for the school districts of Hawaii includes additions to the Kailua High School. Ernest H. Hara, AIA, is the architect of the additions, with Yoshio Kunimoto as structural engineer of the project.



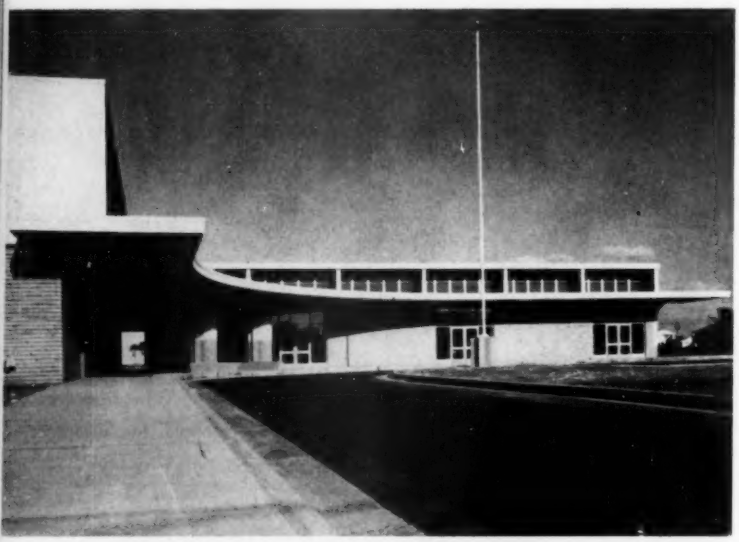
Another new project is the Wahiawa Second Elementary School designed by Law & Wilson, architects and engineers. Units of the school are connected by covered passageways. The openness of the plan provides outdoor space for each classroom unit.

Kalihi Elementary School is a multi-story plan on a sloping site. Architects are Akagi, Hara, Nishida and Onodera, with Yoshio Kunimoto the structural engineer.

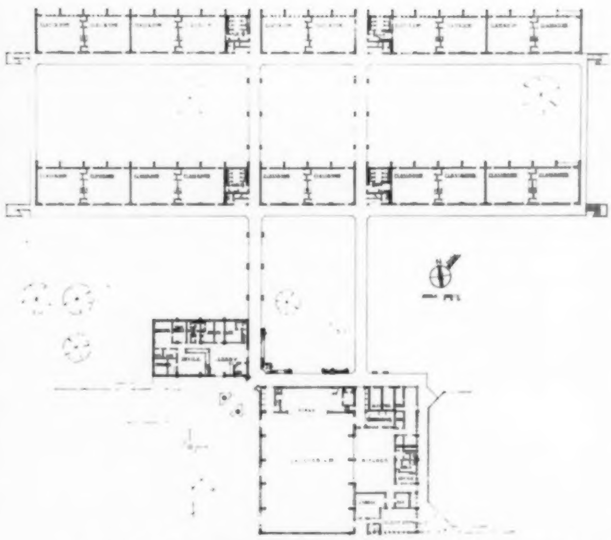


Williams Photography

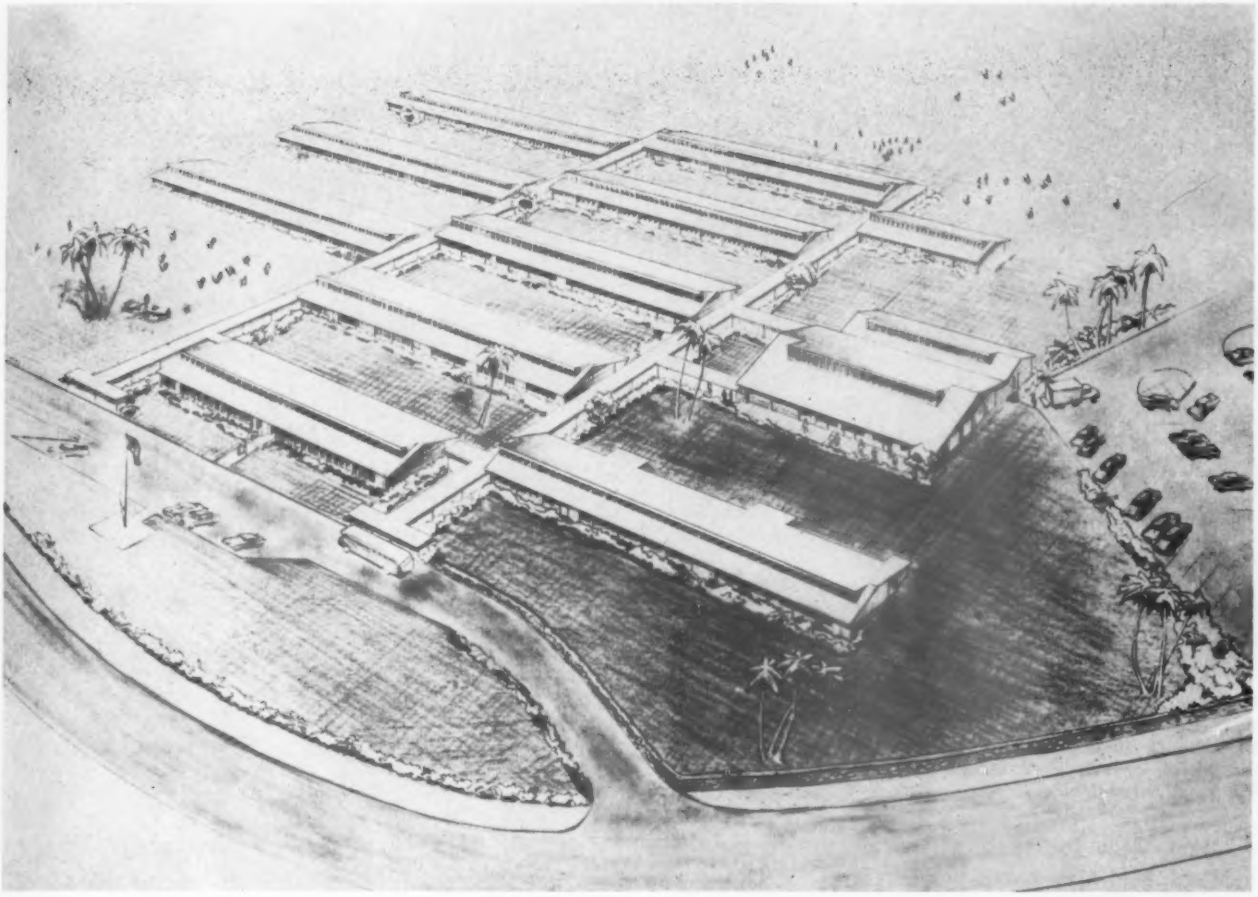
Nimitz Elementary School, located in Pearl Harbor, includes two two-story classroom units and a section for administration, the library and a cafetorium. Architects and engineers are Law & Wilson.



Curved entranceway leads to the administration unit, at left, and the cafetorium at right. Below is a view of a typical classroom. Storage cubicles line the wall area beneath the windows. Opaque panes are used in top portions of window area for glare control.

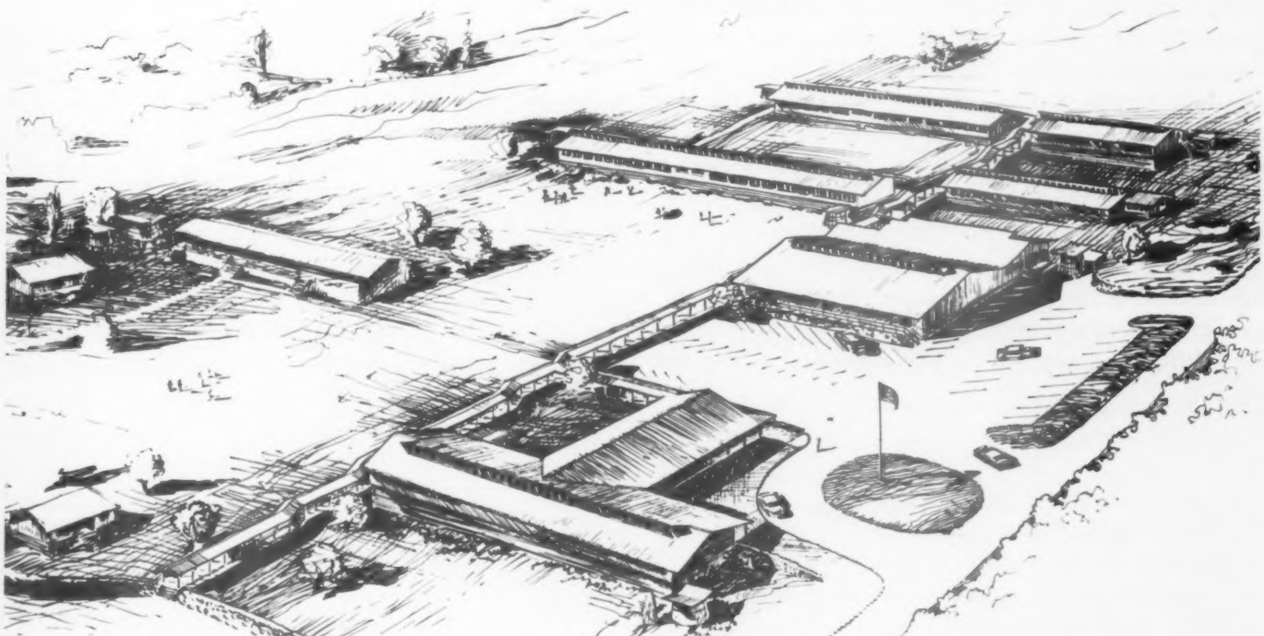


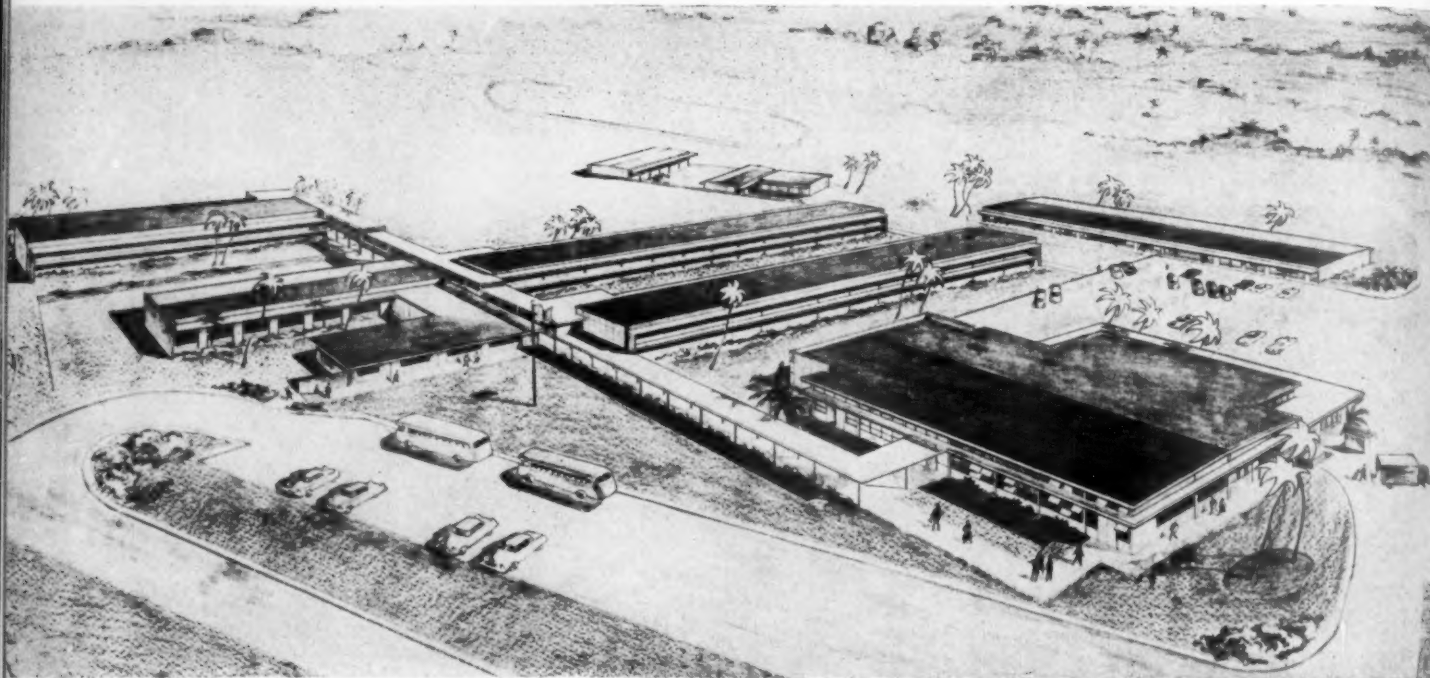
Library of the Nimitz Elementary School is located above the administration facilities. Open space at right center is for a future kindergarten unit. Two story classroom units have open concrete passageways and stairways. (See photo below.)



Clerestory lighting is planned for all units of the Lihue Grammar School in Lihue, Kauai. Bus approach is at the foreground, with the service entrance provided at the right. Ernest H. Hara is the architect, with Thomas T. Nishida and Kenji Onodera, associate architects for the project.

Units of the Konawaena High and Elementary School are oriented to a sloping site. School, located in Kealakekua, Kona, Hawaii, is designed by Ernest H. Hara, AIA, architect.





Secondary school facilities in the Territory of Hawaii will be supplemented with the construction of the Aiea-Pearl Harbor High School. Situated on a site which will include athletic fields, the school was designed by Ernest H. Hara and Theodore A. Vierra, school architects.

duration of the critical shortage of classrooms and their related facilities, such as administration, cafetorium and library units. However, these so-called "fringe" facilities are included in the master plans of new school plants for possible future construction.

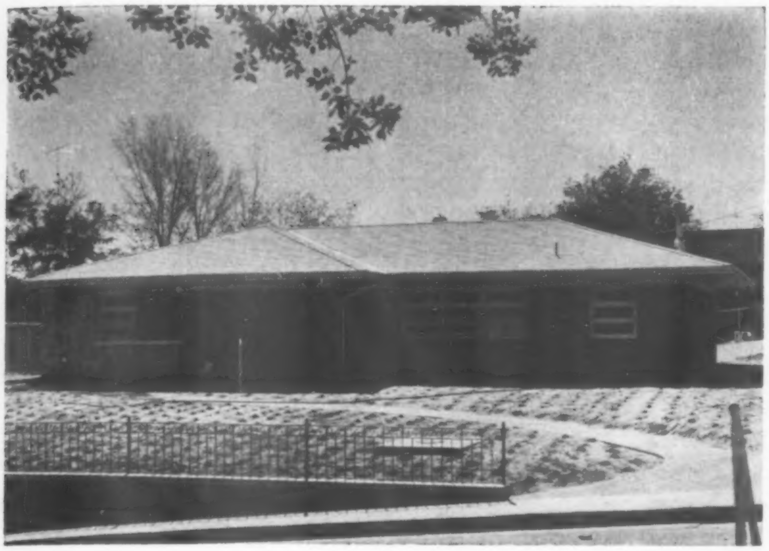
How Hawaiian Schools Are Financed

The Hawaiian school construction program is financed primarily by long-term interest bearing bonds. Presently, the Territory has far exceeded the bonded indebtedness set by the Congress of the United States and will not be in a position to finance any further school construction until the latter raises the rate applied on the tax assessed valuation of the Territory. A resolution requesting the Congress to make this change was recently introduced by the Hawaii Delegate to Congress. In the meantime, the City and County of Honolulu is floating its own limited county bonds to meet the ever-growing school building needs.

While the impact of the new construction program is present, no replacements of existing plants, thirty to fifty-year-old wooden frame buildings, are contemplated except for a few isolated cases. Local authorities are in hopes of replacing these obsolescent plants on a pay-as-you-go basis when rising populations hit a plateau.

Plans for the Future

Whether Hawaii will be able to cope with its school construction program to best advantage depends upon the acceptance of certain basic recommendations. These were proposed by the Stanford University survey team of educators, who just completed a year-long study of the Department of Public Instruction. In the area of school building planning, the survey recommends the following: (1) a long-range master plan; (2) the formulation of educational specifications; (3) better methods of selecting architects; (4) more joint planning of schools and public parks; (5) a revolving fund for site purchases; and (6) the employment of a part-time architectural consultant.



The Kindergarten Cottage for Concordia, Kansas, was designed by Carl G. Ossmann and Associates of Topeka.

COTTAGE SCHOOL FOR KINDERGARTENERS

by CARL G. OSSMANN

Carl G. Ossmann & Associates, Architects, Topeka, Kansas

Carl G. Ossmann has B.S. in Architectural Engineering and M.S. degrees from Kansas State College. He has done free lance architectural work and some teaching, with several years as superintendent of schools in Greenleaf, Kans. During World War II he was a Lt. Commander with the U.S. Navy. Mr. Ossmann's recent architectural work includes many schools throughout Kansas. He is registered in Kansas and Missouri.

and CARL A. JAMES

Superintendent of Schools, Emporia, Kansas

Dr. James has an A.B. from the College of Emporia, an M.S. from USC and a D.Ed. degree from University of Kansas. He had served as superintendent of schools in the Kansas communities of Rosalia, Toronto, Osage City and Concordia before going to Emporia in 1956. Dr. James has been president of the Kansas Society for Exceptional Children and vice-president of the Kansas State Teachers Association.

THE Concordia, Kansas, Kindergarten Cottage developed as a result of adverse building conditions within the school district. The cottage has proved so satisfactory that other schools are copying this type of educational unit, even when the original difficulties which prompted its use in Concordia do not exist.

To review the problem briefly, additional facilities were needed at the Washington School which has been standing since 1918, and which represents the typical school architecture of that day. An addition to the school proved to be architecturally difficult because of its location on the crown of a hill in a heavily populated district of the city. To tear the building down was economically unwise since it is a fireproof structure and has satisfactory heating and ventilation systems.

Kindergarten Was Inadequate

Originally the school was designed to house grades one through eight. The construction of a new high school in the district made it possible to eliminate grades six, seven and eight, thereby increasing the capacity of Washington School for the lower grades. One problem remained. The kindergarten was forced to meet in a second story room which had virtually no accommodations for the modern concept of kindergarten education.

Adjacent Land Is Acquired

The Board of Education, as advised by the superintendent of schools and the architect, acquired land adjoining the school property, and the site was cleared and fenced.

The following factors were considered in the decision to separate the Kindergarten Cottage from the remainder of the educational plant. It was first determined that the playground activities of the kindergarten children would be kept separate from those of children in the first grade and higher. In fact, it is undesirable to mix these two age groups. The kindergarten age is

one of exploration and initial adaptation and acquaintance within the child's own age group.

No Supervision Problems

The times of arrival at school and departure from school differ from those for the first grade and up, therefore the kindergarten location could be away from the rest of the school. From an administrative standpoint, the cottage is close enough for supervision. The building is a half block from the Washington Grade School, within easy access of the principal's office.

Art and music supervisors bridge the short distance to bring art and music activities to the kindergarteners in a program kept separate from the first grade level. All things considered, it is decidedly advantageous to have the kindergarten unit apart from the other grades of the Washington School.

Attention was given to avoid duplication of equipment and maintenance care for a separate playground for the kindergarten children. Conclusions were that equipment designed for kindergarten levels would not be used advantageously by the first grade and older children and, conversely, equipment designed for first grade and higher could be dangerous and, moreover, was not needed at the kindergarten level.

A Pleasant Environment

It is important, from an educational standpoint, that kindergarten children start out on their school careers in pleasant surroundings. The Concordia Kindergarten Cottage has been the means of providing such surroundings.

Minor factors entering into the development of the cottage included the possible future demolition, remodeling or rebuilding of Washington School. Should any of these situations occur, the modern Kindergarten Cottage of 1957 would have a life span of many more years than the present grade school building.

In choosing the style of architecture for the building it was felt that the cottage type was far superior. It gives the child a feeling of home and removes the awesome effects a mammoth school building is apt to have upon five-year-olds. From an economical point of view, should future educational standards and needs vary, this type of cottage could always be converted into a residence and sold for as much or more than its initial worth.

Easy Access from Street

As is seen by the plot plan, the cottage is placed so that it is easily reached from the street by parents who pick up and deliver their youngsters. The play area is to the south at the rear of the building. From here there is direct access across a concrete patio to the interior of the building.

The site of the play area is level, well drained and protected from north and northwest winds. A maximum amount of indoor-outdoor activity for the pupils and teacher is possible. Being located in a state where extremes of weather conditions do exist, it is advantageous to the school program to have a protected play area.

As may be noted in the plan and elevations, the building is oriented to allow maximum light and glass area to the east and south. This results in cheerful light-

Corner of the kindergarten interior has wall tackboards and a low work counter. Cabinets beneath the counter are scaled to size of the users. Wainscot is ceramic tile.

ing and shadow conditions during the morning hours which are normally quite cool, and permits a limited amount of protection from the late afternoon sun.

Interior of the Cottage

The interior of the cottage is divided into a classroom and play area with tackboards, storage facilities and wardrobes distributed to give convenience to the teacher. A work counter and a project sink are included along the north wall of the play area.

The furnace room, girls' and boys' toilets, storage section and teacher's room are placed on the west side for economy of location as well as accessibility.

One special feature of the cottage is a glassed-in vestibule in the classroom area. This provides a place where the teacher may have short conferences with mothers and still be able to observe activities of the children. The vestibule-conference room has proved to be a useful area. Many times a mother likes to speak to the teacher for a few moments when returning her child to school after an absence caused by a cold or some minor illness.

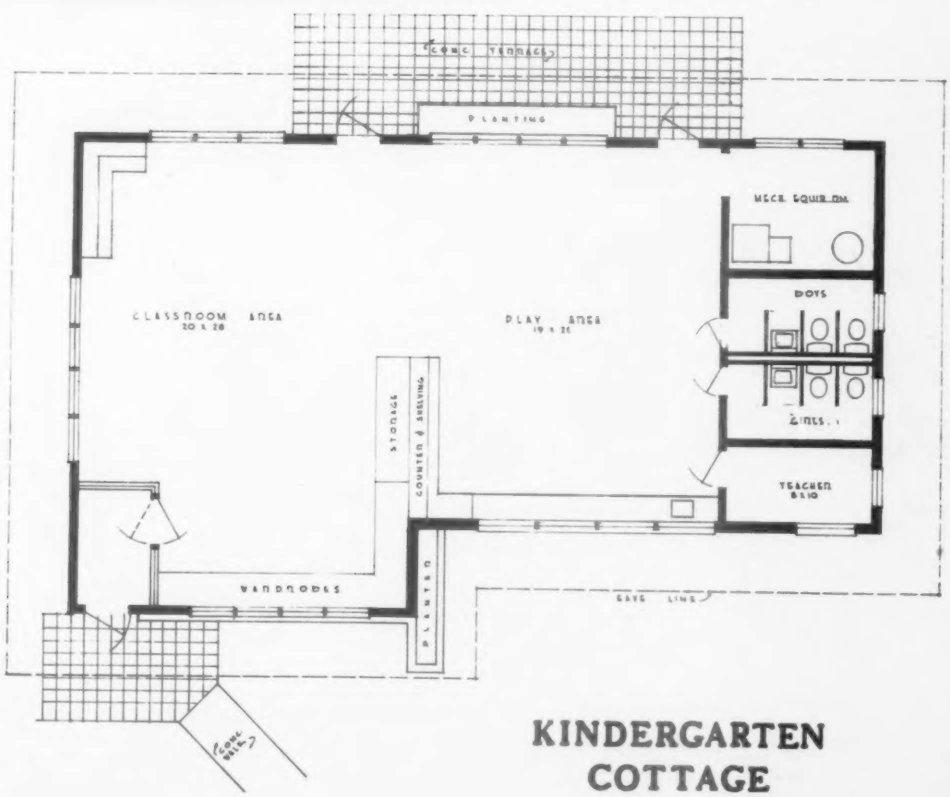
A window from the vestibule area permits observation of the sidewalk and entrance to the cottage. At no time is it necessary for the teacher to be out of contact with the children from the moment they leave their parents' cars in the street until they are inside the classroom.

Details of the Interior

The interior of the building is finished with asphalt tile floors, glazed ceramic tile wainscot, exposed Haydite

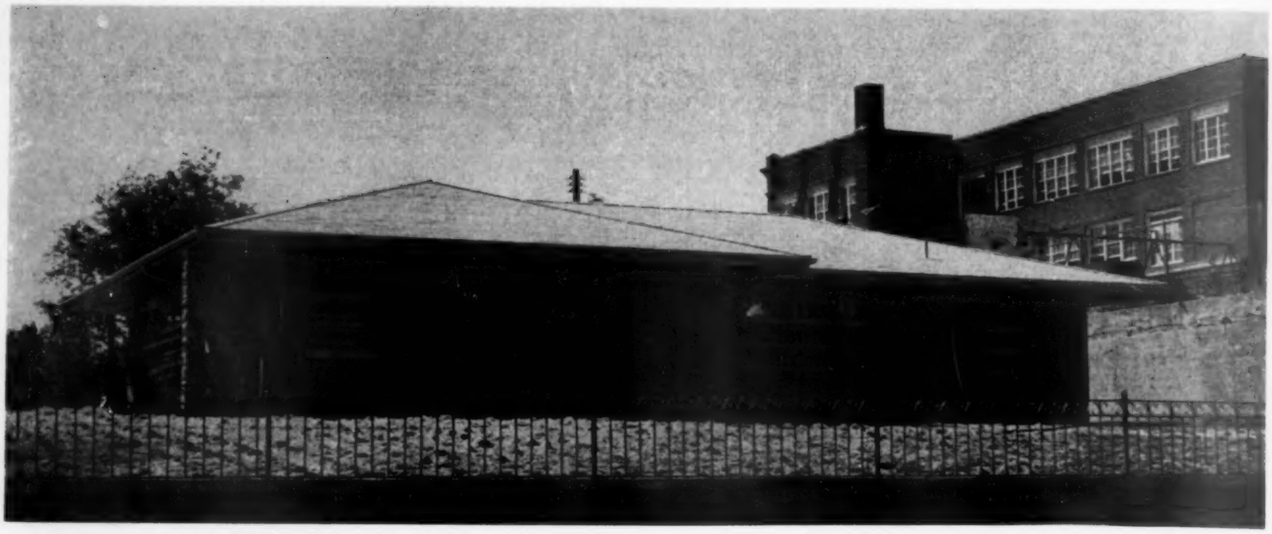
Switzer Studio

Modern-fold doors at rear conceal the wardrobe area of the room. Glassed-in vestibule is visible at the rear. Vestibule serves as a conference area for teacher and parents.



KINDERGARTEN COTTAGE

A storage section and a work counter and shelving become the room divider between the classroom area and the play area. Separate toilets are provided for boys and girls between the mechanical equipment room and the teacher's room. Two doors lead to a concrete terrace.



The cottage is oriented to allow maximum light with glass area to the east and south. The building is designed to give the child a feeling of home and removes the awesome effects of a large building.

Colorful drapes shut out the sun glare and liven the interior of the kindergarten. Movable furniture may be arranged according to the type of activity in progress.

block walls, and acoustical ceilings. Incandescent lighting is used to provide both warmth and adequate illumination. It has been found that fluorescent lighting in kindergartens tends to give the illusion of coolness, even though temperatures do not vary much from sunny to cloudy days.

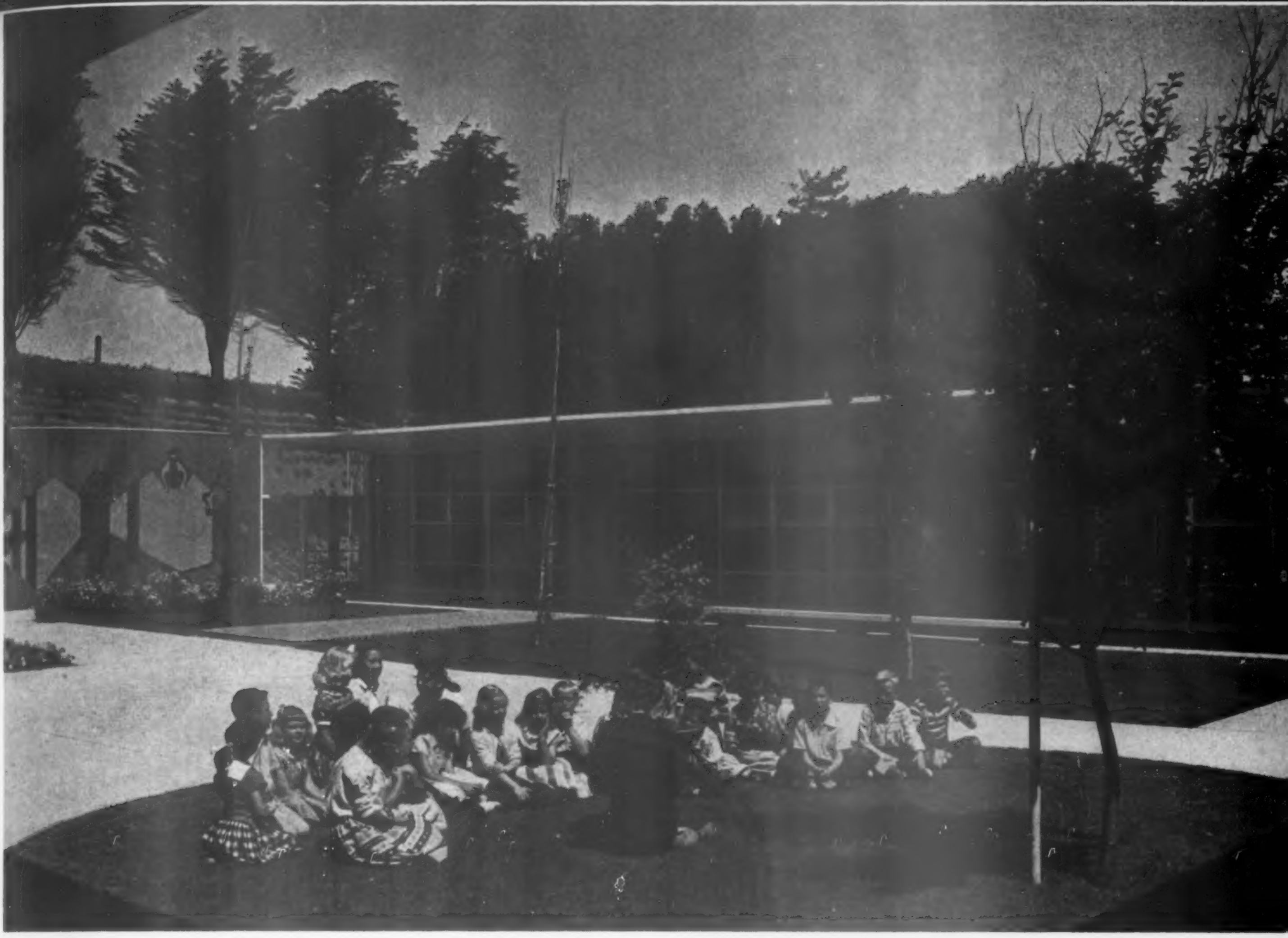
The construction of the building includes masonry walls, concrete slab on grade floor, and a structural wood roof with asbestos cement shingles. A system of hot air heat is used, providing space heat for the classroom areas and modified heat for the floor.

After the first year of usage it is felt by the School Board, the teacher and patrons of the Concordia School District that the cottage type of kindergarten facility fills a definite need. It is especially adaptable for those districts facing problems, similar to those of Concordia, where adequate grade school facilities are available, yet kindergarten spaces are lacking.

Recommended to Other School Systems

The cottage kindergarten building is also suitable for any school system wishing to improve kindergarten facilities without necessitating budgetary allowances for complete new buildings. The improvements, which result, in kindergarten learning activities are thought by educators to more than compensate for the costs involved.

Children attending sessions in a kindergarten cottage gain a feeling of security which they would not have if forced to associate with groups of older children. And, after all, learning to behave in a society of his peers is almost the major aim of a kindergarten child's school experience. If this goal is accomplished satisfactorily, then school life in the first grade is more likely to proceed in a favorable learning environment.



Traditional considerations of school design were reevaluated in terms of the new problems at hand by architect Mario J. Ciampi and the Jefferson Elementary School District in Daly City, California, where the new Olympia Primary School is located.

MURAL FOR LEARNING AT OLYMPIA PRIMARY SCHOOL

by MARIO J. CIAMPI

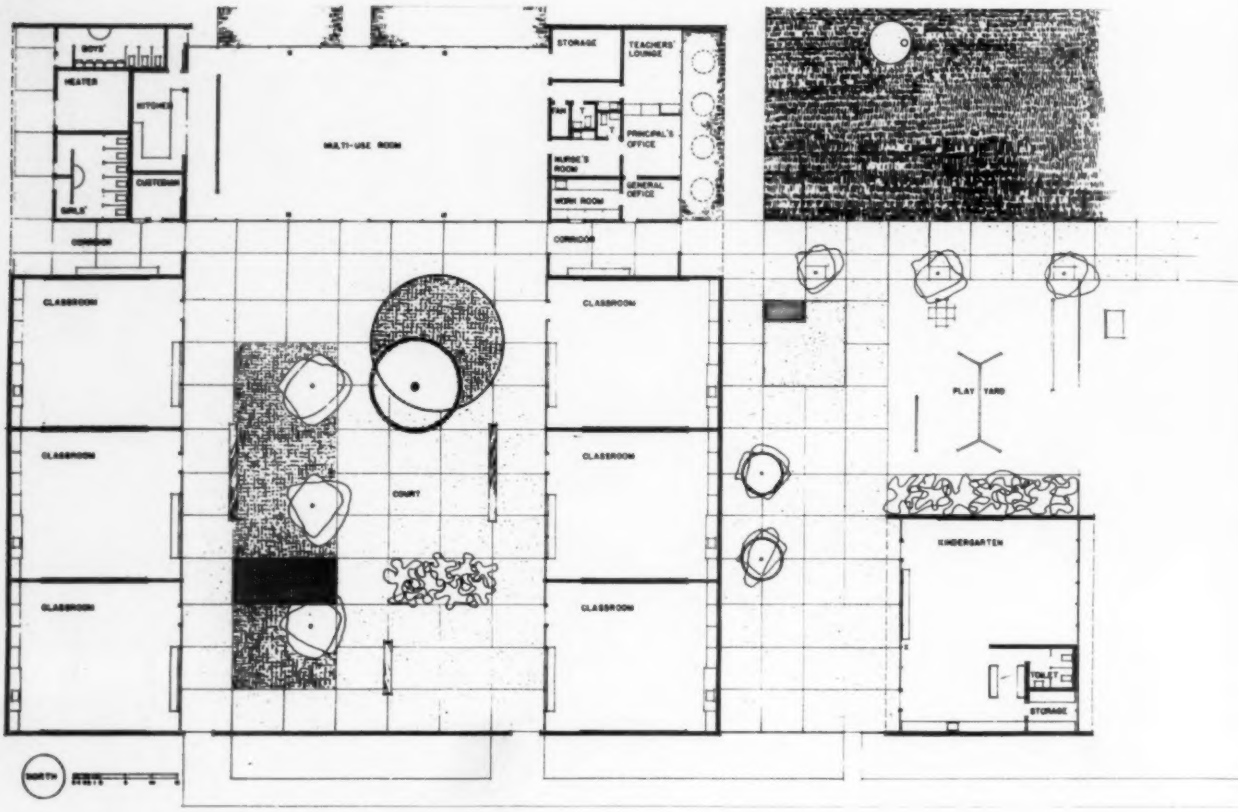
AIA, Architect, San Francisco, California

Mr. Ciampi has been actively engaged in the field of architecture for the past 30 years. He was the winner of two national scholarship competitions to Harvard University Graduate School of Architecture. He also attended Paris' Beaux Arts Institute. Mr. Ciampi has traveled extensively to study contemporary architecture and educational environment.

OLYMPIA Primary School was recently completed for the Jefferson Elementary School District in Daly City, California. The building represents a new concept in educational construction when compared with the more or less orthodox designs which the architect had completed previously for the district.

The results of the district's concentrated school construction program revealed that many basic concepts of school design were not applicable to the problems of this particular school. It became necessary for architect and educator to reevaluate traditional considerations in terms of the new problems at hand.

The Olympia Primary School, which includes kindergarten, first, second and third grades, was designed to function as a home-school unit. It serves as a summer



recreation facility and makes provision for community activities.

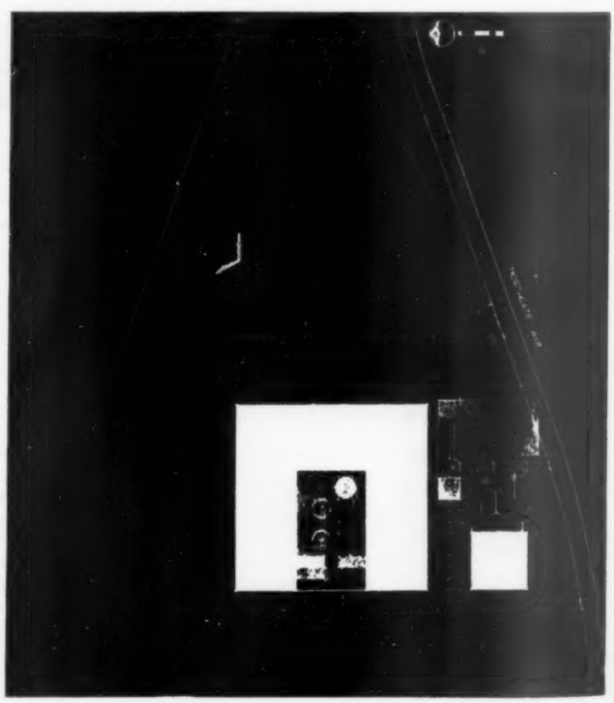
Since the school was to be located in a densely populated urban area, the problems of maintenance and vandalism became important factors in its design. This school is also situated near the Pacific Ocean and is exposed to prevailing winds and fog.

Olympia Primary School has six classrooms arranged on either side of an exterior court. Also facing the court is a multi-use room. The kitchen and service areas and the administration rooms flank either side of the multi-use space. Set apart from the other areas is a kindergarten with its own play yard. Site plan, below, shows the relationship of the building areas to the remainder of the site.

Factors to Consider

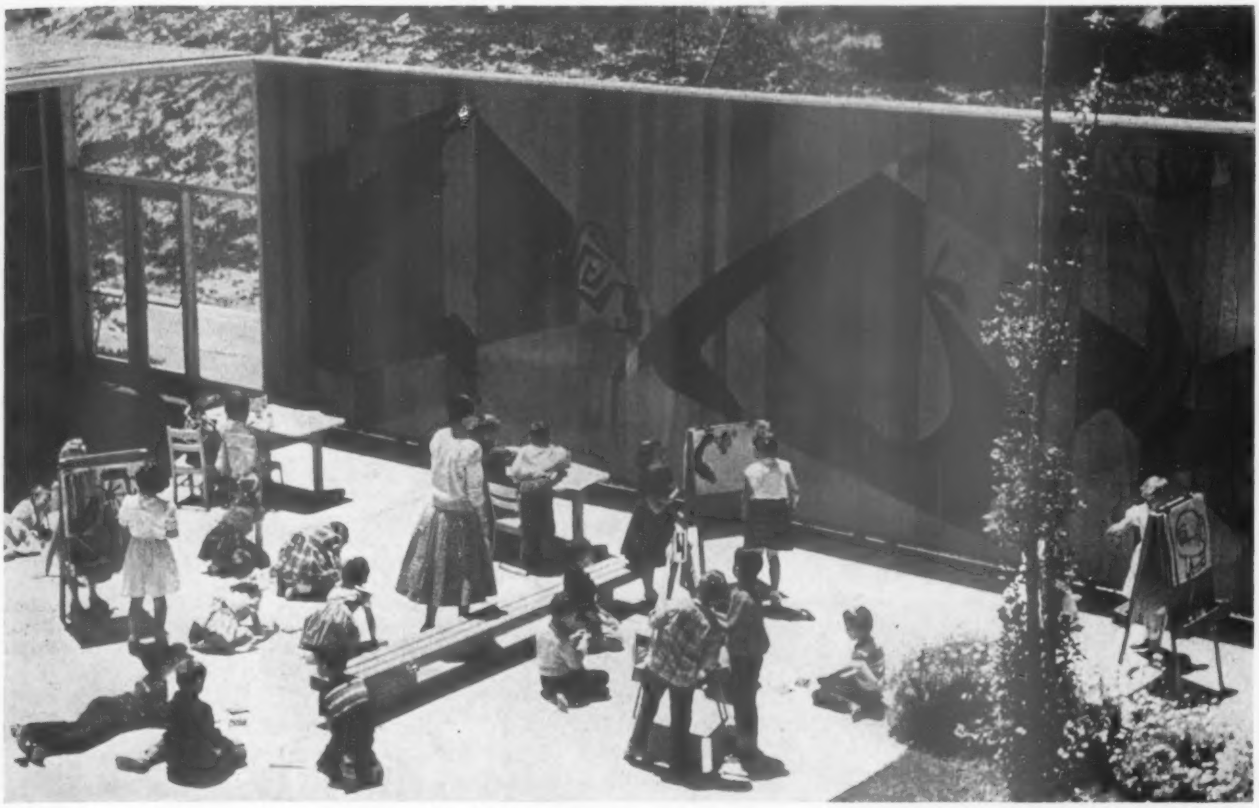
Former experiences with other school projects in the area indicated that, while serious efforts had been made to provide adequate natural illumination in these buildings, electric lights were burning almost continuously. Perhaps the reason for this was that the artificial illumination seemed to create a more pleasing environment. Maintenance of wood and stucco type buildings has also been a factor of considerable time and expense in this district.

The Olympia School was, therefore, constructed with a reinforced concrete roof employing the lift slab method. The exterior walls were constructed of reinforced concrete blocks with a textured pattern and painted a warm color to create a pleasant exterior.



An Interior Playcourt

The classrooms are designed to face an interior, landscaped playcourt which is completely enclosed and planned for easy maintenance. The classrooms are equipped with luminous ceilings to provide a uniform brightness of 65 foot-candles. The classroom window



The mural is an important part of the school's educational offerings.

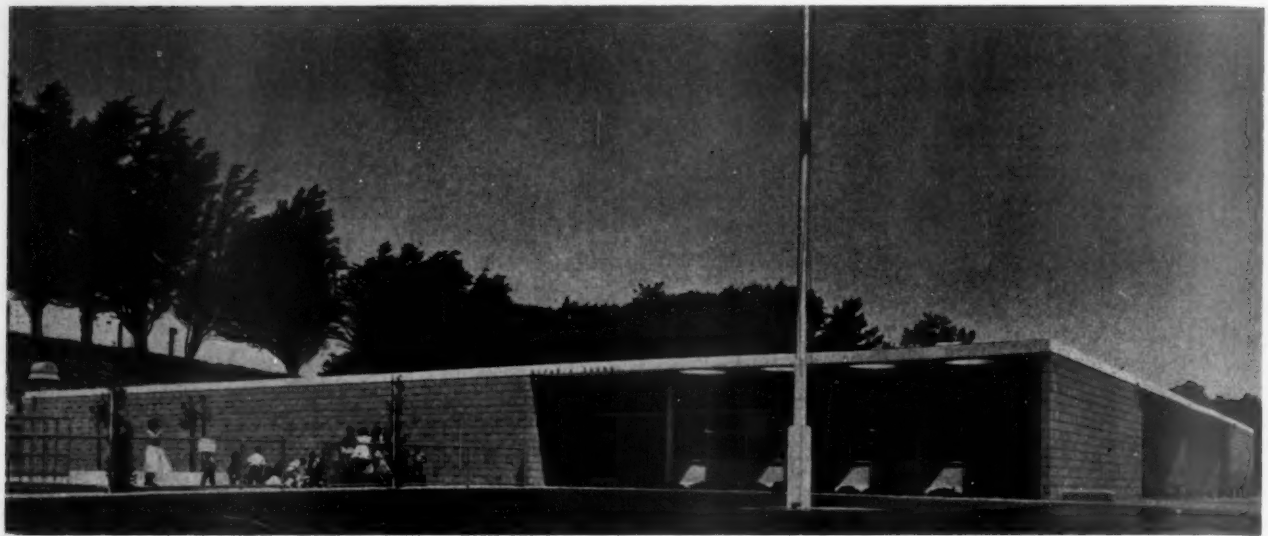
wall, which faces the court, has colored glazed inserts to relieve the monotony of the regular panes.

The school is finished in natural woods. Bright colors were introduced in many of the wall cabinets, panels, dividing walls and doors. Partitions are plywood and painted plaster. The building has radiant heating and forced air ventilation in the classrooms.

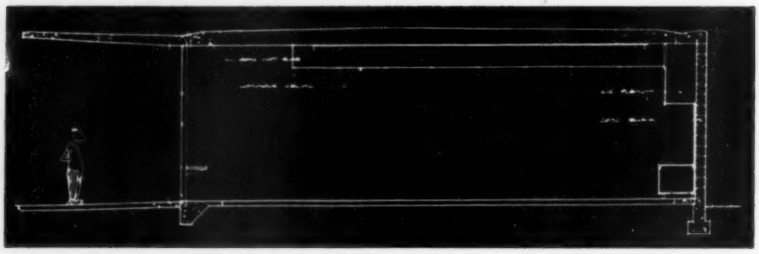
The fundamental objective in the concept of the school was to create an ideal teaching and learning environment which not only met all of the material considerations which have been described but also made this school a center for the enjoyment of those using it. It is a building that is intended to stimulate pride in the community as a place where adults as well as children may share its pleasures and attractions.

The cost of this project, $176,900, including all

Each of the six classrooms opens onto the interior courtyard. The gaily designed mural covers the west end of the court, within view of each room.



Photos by Rondal Partridge



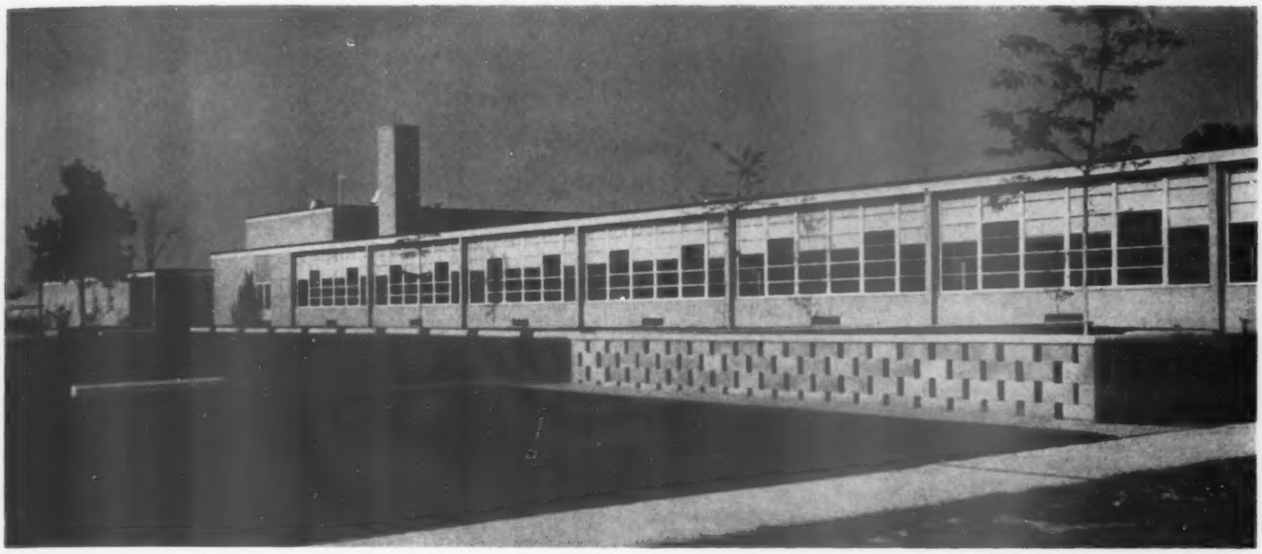
Olympia School was constructed with a reinforced concrete roof, employing the lift slab method. Exterior walls are of reinforced concrete blocks with a textured pattern, painted a warm color to create a pleasant exterior. Classrooms (see cross section at left) have a luminous ceiling.

these features but excluding the cost of site work, amounted to $12.75 per square foot. This cost is comparable to or even less than that of some of the more conventional schools which the school district has completed. The building has six classrooms, one kindergarten, an administrative unit and a multi-purpose room. Its capacity is 205 students.

An Education Mural

The architect, in his desire to emphasize the importance of the arts in education, included an education mural at his own expense on the west end of the central court. The school children became intrigued with the mural. Their enthusiasm was such that they were prompted to make colored reproductions of many of its features. It is common to see classes of outdoor "artists" busily at work before the mural.

The architect and the school district are now observing and evaluating the experiences of those who occupy this school. As a result of this study they are giving further consideration to many favorable qualities for incorporation into new work.



Total amount for all contracts for the Berwick School was $300,-978. Building was designed by the Board of Education architect, David Schackne, Jr., and has 14 classrooms, multi-purpose room, library, kitchen and administrative, teachers' and storage spaces.

LATEST ELEMENTARY SCHOOL, COLUMBUS, OHIO

by DAVID SCHACKNE, JR.

Architect, Board of Education, Columbus, Ohio

DURING the five years prior to the design of Berwick School, the Columbus, Ohio, Public School System had constructed over sixteen new elementary buildings. A conservative pattern of design had been followed, which befit the city. Also, a precedent for low cost had been established and this was (and is now) very popular.

Before becoming architect for the Board of Education, I had two years of experience working with Edward Kromer my predecessor, who had held the post for thirty years. He had been exposed to all kinds of problems during that time, and I did my best to learn from him.

Thus, the design of Berwick School was approached with a fresh hand guided by very recent and conservative experience. We wanted to do a design that would be simple in appearance, could be easily built by local contractors and which would be low in cost. Our architectural staff spent many hours discussing the possibilities of various kinds of construction.

In almost all of our recent buildings the fenestration was glass block above and vision strip below; the whole window being a large hole in the brick wall. We reasoned that, since window shades were standard equipment in all our buildings, we would do without glass block and use only a standard projected window. By running windows from wall to wall we almost eliminated the exterior brick. We reduced the glass wall to the limits of the code and established a room with the narrow side to the corridor. This cut down the periphery of the structure and the amount of brick needed. The corridor length was also shortened.

Attention to Acoustics

The 8-inch block walls between the classrooms became bearing walls and their mass dampened sound. Sound control was carefully studied. Light-weight concrete block offered good acoustic qualities plus weight to reduce sound transmission.

A long span metal deck, left exposed and painted, also serves to baffle sound. At the back of the room above door height is a wall panel of white acoustic tile which satisfies the desire for acoustic tile in the classroom and reflects some natural light into this darker area.

Book shelving, which had been built-in under the

Kindergarten has a work alcove complete with a sink and cabinets. Open storage units line one wall. The long span metal roof deck is left exposed and painted.

windows in previous schools, was redesigned into a freestanding room divider. This eliminated the need for coordinating the built-in woodwork with the masonry and heating equipment.

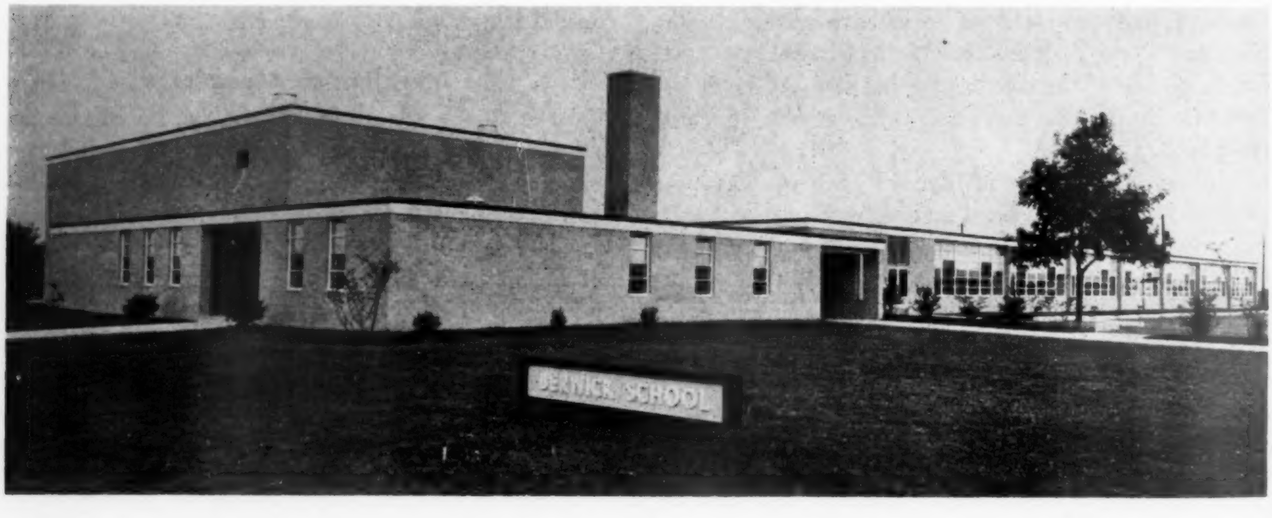
Corridor Wall Detailing

With the concrete block walls between the classrooms carrying the roof deck, the corridor wall became a non-bearing screen. Some thought was given to using all glass above door height, but desire for acoustic tile on the classroom side and less complicated detailing on the corridor brought the final solution. This wall is frame-surfaced with gypsum lath and vertical wood paneling.

Above the classroom doors a glass transom allows the white ball-like pendant fixture to illuminate the corridor and, at night, to spill light into the room. These corridor lights, together with exterior lights, are operated at night by a clock.

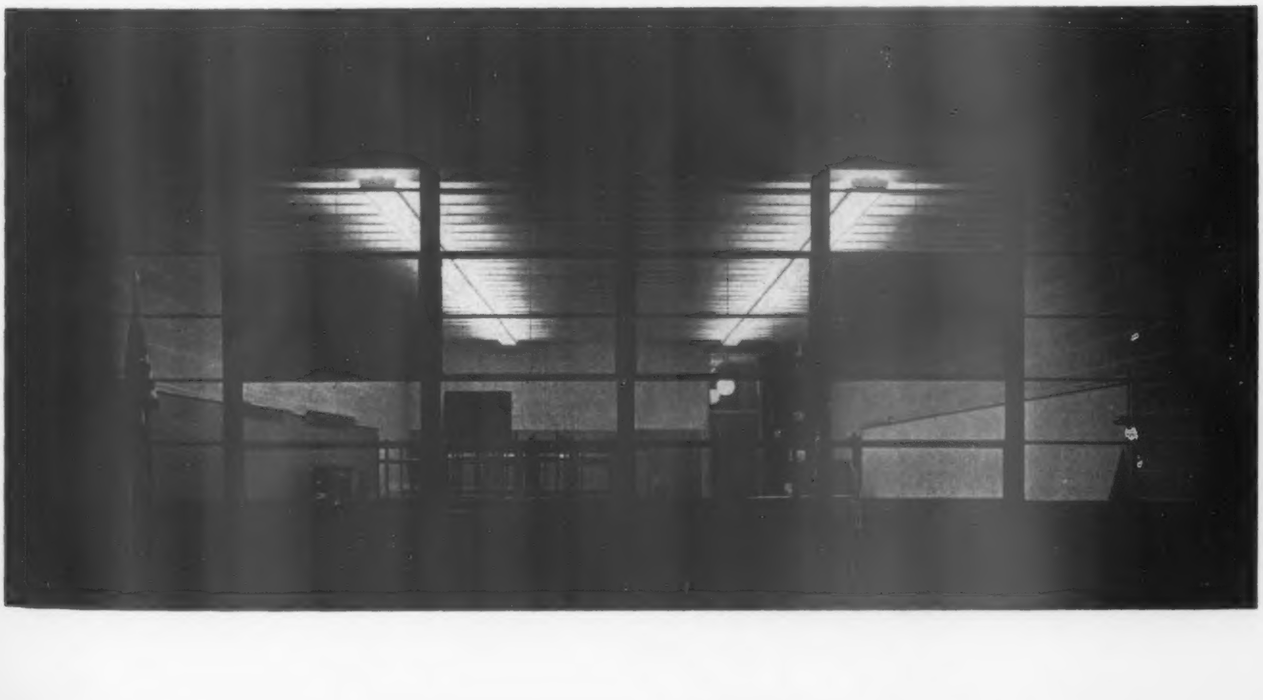
In each classroom four panes of green colored glass

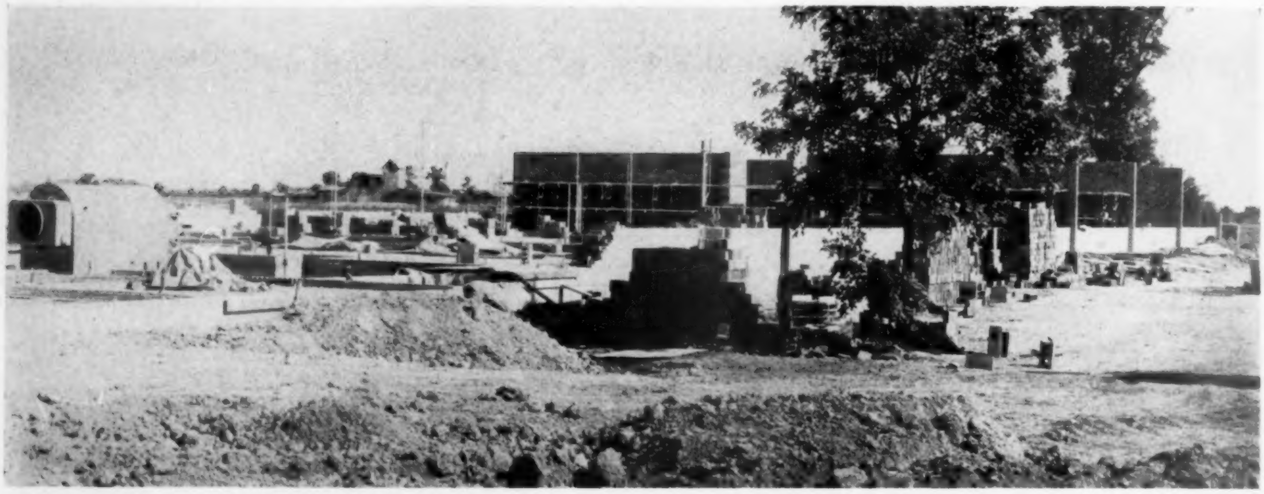
Berwick School has a site of eight acres. Off-street parking is separated from the playground area by the building itself.



Landscape architect for the school is Marion V. Packard; mechanical engineers are Samuel R. Lewis & Associates; electrical engineers are Gould H. Ayres & Associates; structural engineer is Russell S. Fling.

Four panes of green glass are included in the window area for each classroom. These soften the large expanse of glass and add interest to the rooms.





Berwick School during construction. Large trees on the site were saved and are now part of the landscaping for the school.

are used to soften the large expanse of clear glass and to add interest to the room. This detail improves the exterior by day and especially by night.

Site of Eight Acres

Berwick School was constructed on a site of eight acres. The building contains fourteen classrooms, a multi-purpose room (40′ by 60′), a stage, principal's office, outer office, health room, library, storage rooms, teachers' room, kitchen, toilet and boiler rooms.

The site was part of a golf course. Construction began early in April, 1957. At that time the project was without roads, water, gas, sewers and electric power. When school opened in September, all these problems were solved.

The interior of the building, as well as the building as a whole, was related to the site with much consideration. Off-street parking is separated from the playground area by the building. The mechanical room is located near the street service. This makes for short runs and no interference whenever the building is to be enlarged.

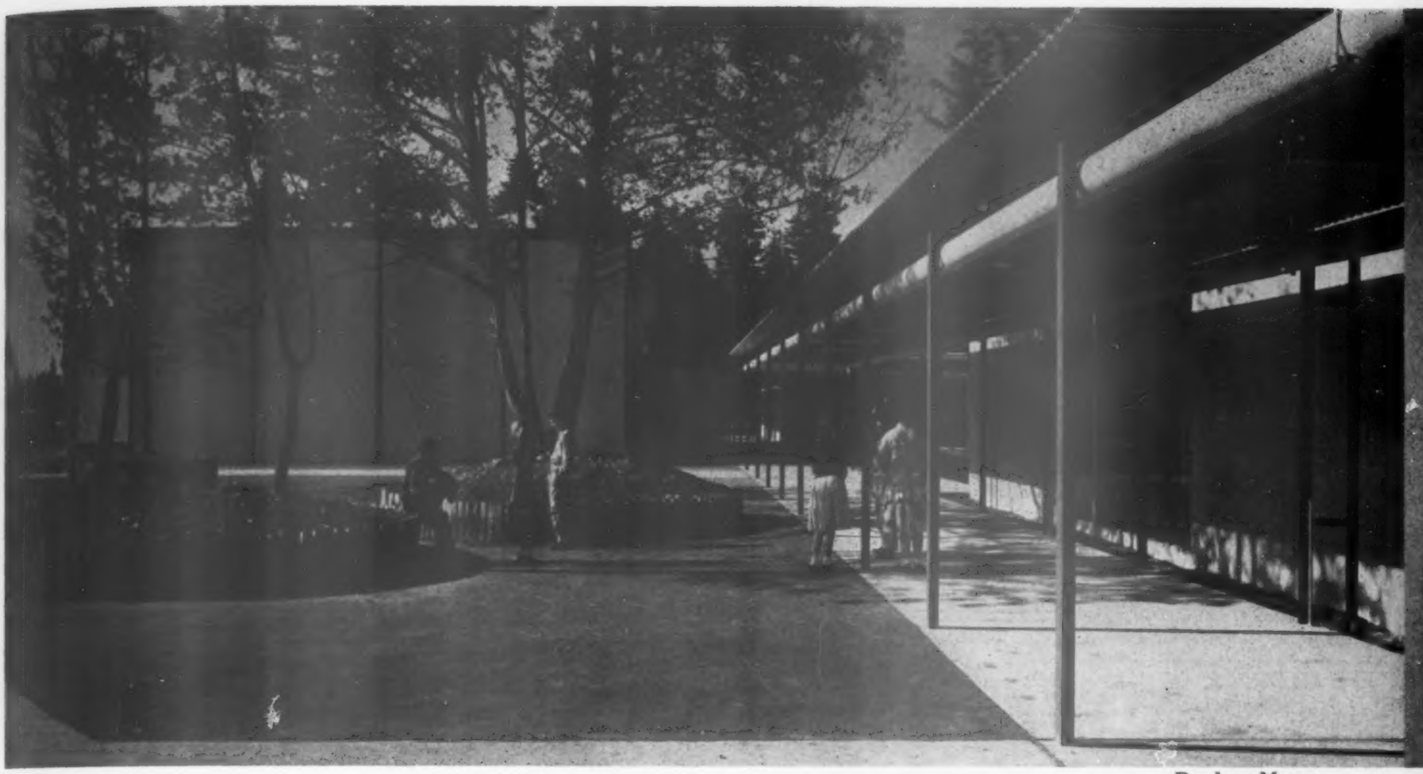
Site and Building Costs

Total amount of all contracts was $300,978. Cost per square foot was $12.40. Charges for the site totaled $21,000. Heating is by hot water and unit ventilators. There are perimeter pipe tunnels. The construction of the school is concrete slab on fill. The long span steel deck has two-inch fiberglas insulation above.

Complete site improvements include blacktop parking and play areas, concrete walks, fencing, sodding and fine grading and seeding. Trees and shrubs were planted to beautify the site.

General contractor of the school was the Wagenbrenner Construction Company. Plumbing and heating was by Grif M. Lewis.

No effort was made to orient classrooms with regard to the sun. Future expansion will probably leave the building L-shaped and thus provide all kinds of exposure.



Dearborn-Massar

Administration unit of the Woodway Elementary School is at the right of the entry court. Simplicity of the walkway, and the heat lines are particularly noticeable here.

WOODWAY ELEMENTARY, THE "SEE-THROUGH" SCHOOL

by ROBERT H. DIETZ

AIA, Waldron & Dietz, Architects, Seattle, Washington

Mr. Dietz has a B.Arch. degree from the University of Washington and a M.Arch. from Massachusetts Institute of Technology. After serving as construction supervisor for MIT, and research engineer for Princeton University, he was associated with Boston architects Anderson & Beckwith. From 1947 to 1952 Mr. Dietz was an associate of J. Lister Holmes and Associates, architects of Seattle. Since 1952 he has been a partner of his present firm. Mr. Dietz has been an associate professor of Architecture at the University of Washington since 1947.

THE story of the Woodway Elementary School in Edmonds, Washington, covers approximately three years of planning and construction. The school, as finally envisioned and completed, went through three distinct stages. These three stages might be referred to as: the planning, which was a rather unusual relationship among the planners; the first building stage; and then the final building stage.

In August of 1953 we (Waldron & Dietz, architects of Seattle) were awarded the contract to design the Woodway Elementary School. The first complement was to consist of twelve classrooms, a library, administration center, multi-purpose room, kitchen and other necessary appurtenances to correspond to those areas permitted under the State Department of Education regulations. The ultimate scheme, however, would include twenty classrooms and provision for an outside covered playshed.

Some Critical Restrictions

At the outset, the most critical restrictions were the lack of local funds to build to educational needs, and the level of financial matching aid offered by the State Department of Education. As rigid as these restrictions were, we feel they were the outstanding reasons for developing the scheme which resulted in a

Walkway outside the library has corrugated fiberglas interspersed with the corrugated cement asbestos board used. Court at left is utilized extensively for interim class play.

Dearborn-Massar Photos

building complex both satisfactory as a building and as a teaching environment.

Planning in Harmony

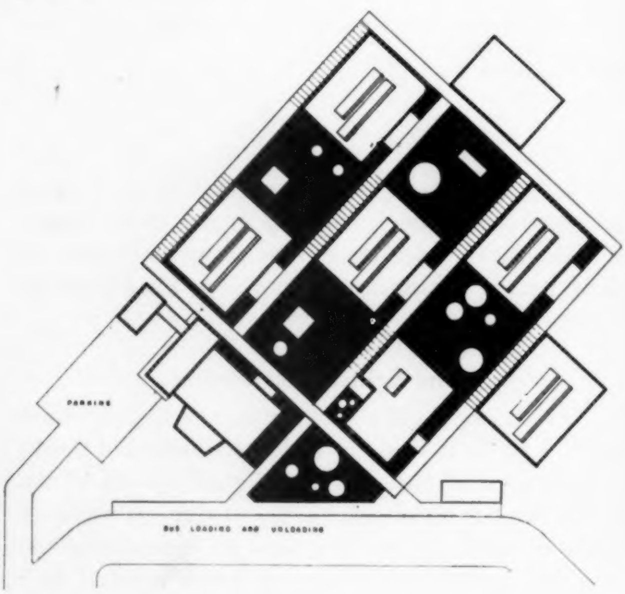
Planning the school was our first experience in working in complete harmony and close cooperation, not only with the school board, but with the citizens advisory council, teachers from all grade levels (1–6), principals, special teachers, administrators, custodians and clerks. All were invited to discuss frankly the type of school building that would contribute most to the school curriculum.

Discussions were tape recorded, edited and mimeographed for distribution and our use. It was the desire of the school staff to offer only those suggestions necessary to make the building functional. They were not to restrict the architect in any way. We felt that this planning process was successful, especially since we had a definite cost limitation to meet and were not hampered by unreasonable demands.

We Develop a Cluster Plan

Prior to this time, we were not aware of the similar schemes of cluster arrangements for school buildings which were being developed in the United States. Shortly thereafter many such schools appeared. Al-

Covered walkways connect all units of the Woodway Elementary School. Courts create checkerboard arrangement with the building units.



Windows of the multi-purpose building, in background, are at eye level. Safety glass is used.

Entry to the administration and library areas reveals space relationship of one room to another. Slot is a book drop.

though these building arrangements have now become fairly common, at that time it was particularly thrilling to us to be evolving a scheme which departed from the commonly accepted arrangement of classroom space.

A previous study of lighting for the classroom, which we had conducted, and the element of economy probably contributed more to the arrangement of the building units than any other factor. We were looking for simplicity of structure, sun and light control, interpenetration of space, which we now find is a most important aspect of school building design, and scale of building in relation to the child.

A first design consideration was the outside walkway. This form of circulation shelter, from cost standpoint, amounts to about one-third that of the enclosed corridor, and its use would help to meet our cost requirements. Having concluded this, we then found that by rotating the classroom about forty-five degrees from the normal north-south, east-west relationship, we could use the outside walkways as sunscreens on all elevations directed to the south, and could pull it away and allow cool north light to flow in on the north side.

Adding Dimension to the Classroom

One aspect of classroom design, which prior to this time had disturbed us greatly, was the closed-in feeling caused by blinds, heavy mullions, walls on three sides and floor and ceiling restrictions. We solved this by piercing the classroom wall on one side, by employing the orientation mentioned above and with the introduction of cool north light through the use of a directional skylight. We then had a classroom flooded with light, controlled yet refreshing, giving a volumetric quality not previously available. The classroom took on a three dimensional quality, with an interplay of space.

A Look Through the School

Visually the occupants, and those on the outside, can look right through the Woodway School. At first it was the opinion of many that this would be distracting to the teacher and especially to the children. This criticism has been found to be entirely without value. Checking with the teachers confirms our original thesis that the child readily adjusts himself to a new and more natural environment, if given a chance.

As previously mentioned, one of the stipulations in designing the school was that it would be planned for twenty classrooms. Community attendance requirements necessitated having the school built in two stages. The type of structure and the incremental size of the building units played an important part in the ultimate development. As it worked out, all parts fell into their respective places as originally planned and the school functions as an integrated whole.

Directional north skylight gives volumetric quality of light to library. Sunscreen effect may be noted at the left.

Natural Landscaping Retained

The site is approximately ten acres in area. Originally the ground was heavily wooded and on it were lovely pine and fir and alder, which is not too highly respected in the Northwest. Before placing the school, all trees in the area of the buildings were surveyed and selected and in turn were partly responsible for the exact location of the buildings. For budget reasons, artificial landscaping was practically impossible and, accordingly, every tree worth saving without undue cost

implications was used to complement the buildings and improve the living space.

Kitchen location and size might be noted. The arrangement is an outgrowth of "room feeding" now used extensively by the district. Although temperatures in this area of the Northwest are not severe, they are uncomfortable at times. However, the delivery of food via the outside corridor has been successful.

Bids for the first unit of construction were opened in July, 1954. This unit was occupied in September of 1955. Bids for the additions were opened in April of 1956; and the units were occupied in the fall of 1956.

Construction was found to be economical and rapid. The structure is a steel frame, complemented by the use of concrete block, aluminum curtain window

Highlighted accent line beneath walkway is the heat line which was integrated with the walkway.

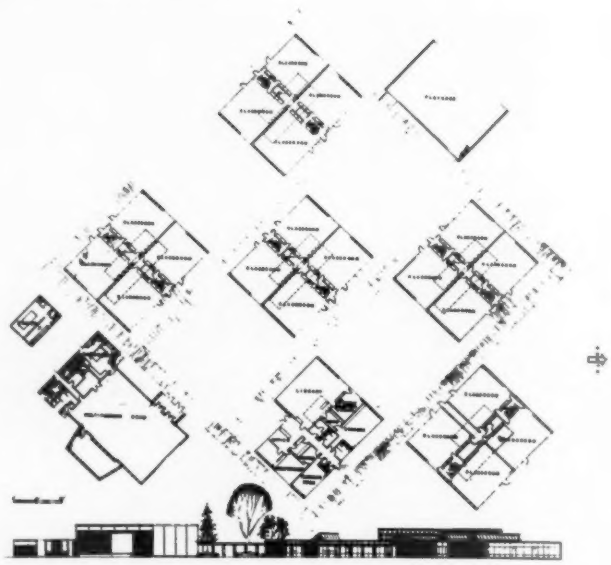
walls and tilt concrete. The roof is a prefabricated steel decking over which has been laid a vapor barrier in addition to 1½" of fiberglas insulation.

Interior partitions are concrete block and double glazed structural clay block placed in stacked courses to give unity throughout. The exterior blockwork is laid up in the same manner to give continuity to the interior and exterior. The tilt concrete walls used in the multipurpose building are unusual. Panels were poured into a steel frame, tilted into place and welded together. Columns and unsightly projections have been avoided.

The exterior walkway is steel frame over which is applied corrugated cement asbestos board interspersed with corrugated fiberglas to allow an interplay of light into the classroom.

The Mechanical Systems

For heating and ventilation, all hot water distribution lines are carried beneath the covered walkway, thereby avoiding tunnels. The administration area and each of the four classroom buildings are heated by individual hot air exchange units. Outlet registers are in the floor along the window walls. Complete air exchange takes place every hour. This system permits the



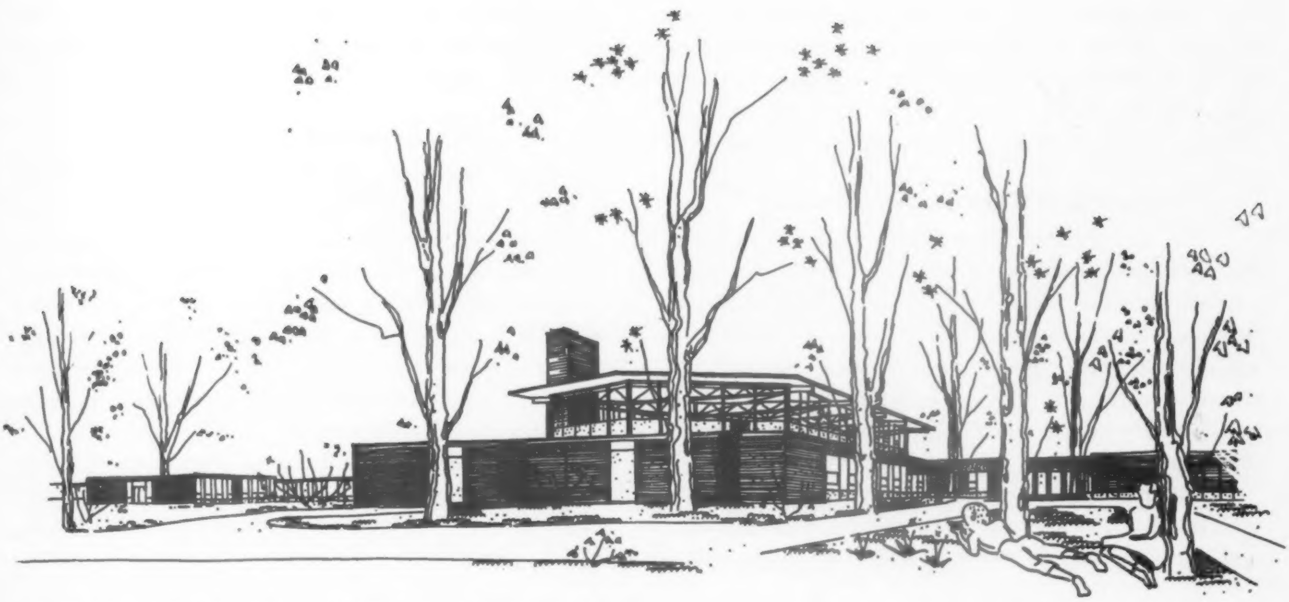
Floor plan of the school is shown above. Below is a typical classroom cabinet unit, scaled to the child. Block, glazed on both sides, provides texture and color for the walls of the room.

use of glass to the floor and obviates the wall ventilator units, allowing more flexibility in room use.

The school is equipped with incandescent lighting, audio-visual window darkening drapes, and a complete intercommunication system.

The total area of the school, including all parts of the original construction and addition, is 39,375 square feet. The construction cost, exclusive of architect's fee and State of Washington sales tax, was $477,222, resulting in a square foot cost of approximately $12.12.

We are particularly proud of the Woodway Elementary School and are pleased to know that the Edmonds School District is enjoying the school facilities planned and designed by the architects, the school people and the community.



Centrally located and easily accessible, the multi-purpose area is extensively used for various school and community activities at the Valley Woods School, Birmingham, Michigan.

INFORMALITY AND FUNCTION IN AN ELEMENTARY SCHOOL DESIGN

by DWIGHT B. IRELAND

Superintendent of Schools, Birmingham, Michigan

Dr. Ireland received his A.B., M.A. and Ph.D. from Ohio State University. Prior to becoming superintendent of Birmingham schools in 1942, Dr. Ireland was assistant professor of school administration at the University of Rochester. He has also taught summer sessions at various colleges.

and TOBIAS J. GERSBACH

Designer, Eberle M. Smith Associates Inc., Architects-Engineers, Detroit, Michigan

Born in Basel, Switzerland, Mr. Gersbach attended the Swiss Federal Institute of Technology in Zurich, where he obtained his M.Arch. degree. In Switzerland he worked as a designer for various firms. Mr. Gersbach joined the office of Eberle M. Smith Associates, Inc. in 1955.

A QUESTION frequently asked by economy-minded lay people is, "Why do we need architectural services to develop a set of plans every time a new school is authorized?" Since, over a period of time, agreement is reached on the kinds and types of facilities required for an elementary school program within a certain type of community, it seems to the lay person that plans could be re-used.

It is sometimes difficult to make local citizens see the importance of building orientation on a site, the variation in site conditions, and the many good reasons why planning for every building must start from scratch if that building is most effectively to serve the community for which it is planned and designed.

Valley Woods Elementary School in Birmingham, Michigan, is an excellent example of how important careful planning is. The site was chosen on the basis of the residential area to be served, its relationship to other school sites (actual or planned), the availability of land in the area, accessibility of utilities, and general contour of the area. The site proved to be a veritable forest with trees varying in size from scrub to thirty inches in diameter. The contour of the site drops approximately four feet from north to south within the building area.

The recommendations to the architect suggested that (1) the building be designed so as to require the elimination of a minimum number of trees; (2) separate play areas be provided for early elementary (K–3) and later elementary (4–6) children; and (3) the building be oriented to obtain the maximum shade and light control and capture the intimate feeling of the wooded

area. The administration realized the need for sufficient sunlight and air to avoid dampness which would increase maintenance costs. It seemed necessary to clear play areas for children and this tied in nicely with the orientation and location of the building.

Classroom Clusters Are Planned

The thought that immediately appealed to everyone was the possibility of planning clusters of classrooms within the wooded area, connected by corridors. Originally it was suggested that three classrooms plus a play area equivalent to one classroom, all under cover, represent each cluster. Cost estimates showed this to be too costly and it was finally agreed that clusters of four classrooms would be advisable.

Preservation of the natural features of the site, with its beautiful and stately beeches, maples and oaks, and planning the classrooms and details of design in proper human scale were foremost principles considered in the development of this kindergarten through sixth grade school.

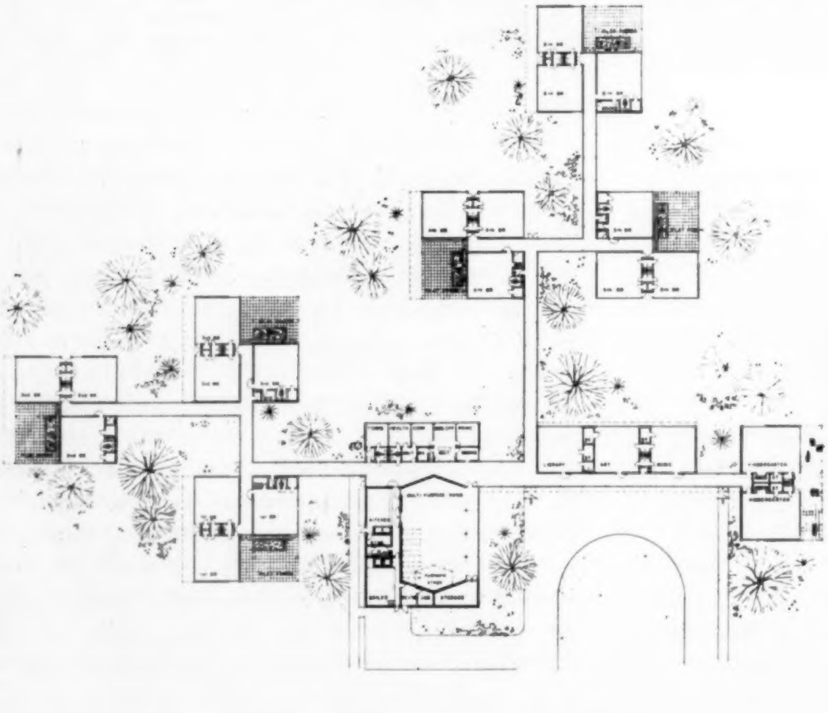
Classrooms With Seclusion

Conditions of the site dictated a decentralized plan of the six 4-classroom clusters (each housing a single grade), placed in an informal pattern penetrating into the woods. Each classroom has a certain seclusion, a homelike view into the surrounding wooded area and a close connection to play areas. Yet the plan is carefully organized to permit direct access to the administrative offices and multi-use areas by means of glassed-in connecting corridors.

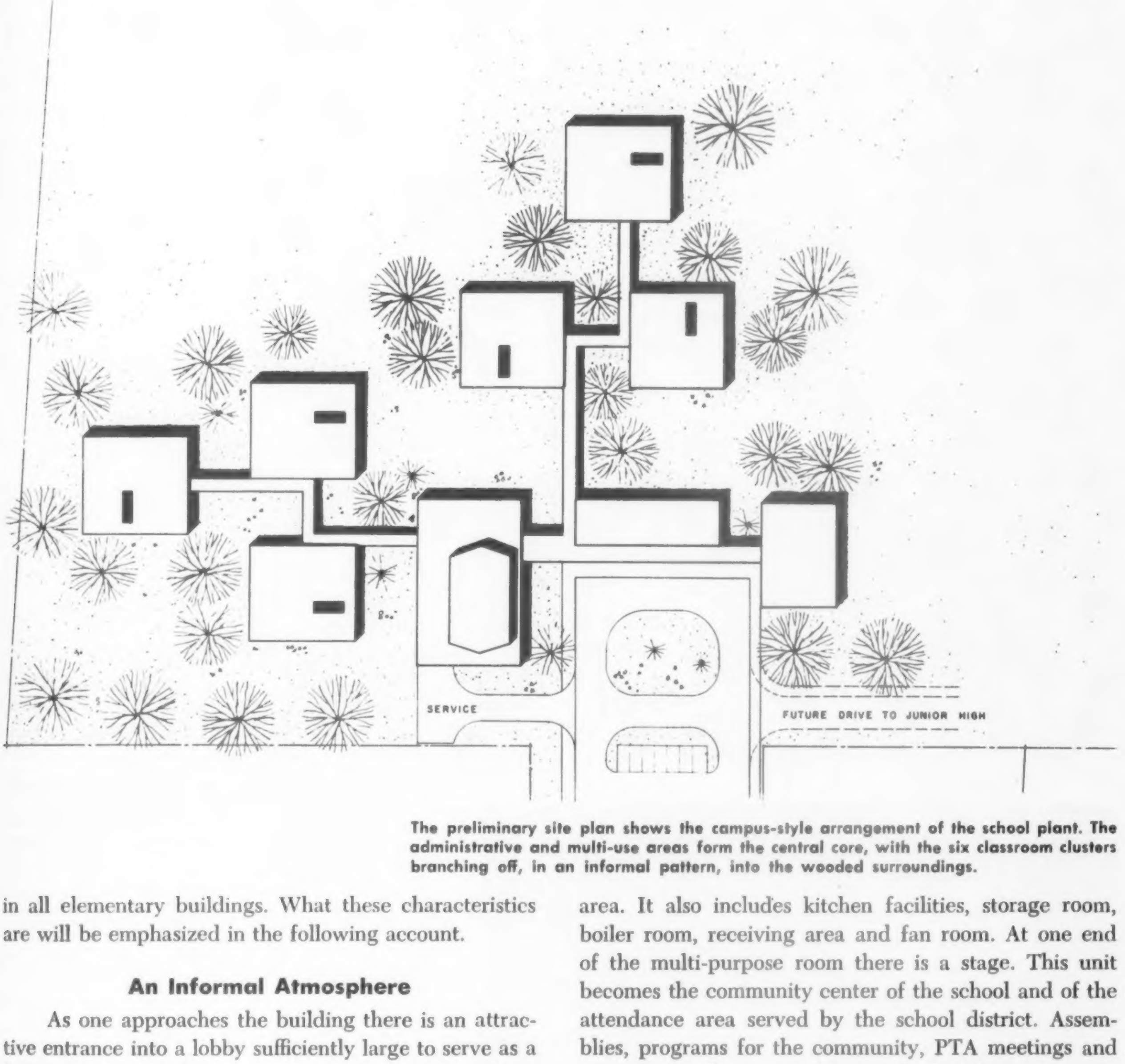
In the building's general design the success achieved in former structures, modified by staff suggestions, became the guide. The administration is convinced that it wants to maintain certain characteristics

Model reveals the general disposition of the classroom clusters in the lovely natural surroundings provided by the preservation of as many trees as was possible.

Lens-Art Photo



The preliminary floor plan for the Valley Woods Elementary School, designed by Eberle M. Smith Associates, Inc., provided three classrooms with a covered play area for each of the six clusters. Estimates proved this arrangement to be too costly and the play areas were replaced by classrooms.



The preliminary site plan shows the campus-style arrangement of the school plant. The administrative and multi-use areas form the central core, with the six classroom clusters branching off, in an informal pattern, into the wooded surroundings.

in all elementary buildings. What these characteristics are will be emphasized in the following account.

An Informal Atmosphere

As one approaches the building there is an attractive entrance into a lobby sufficiently large to serve as a lounge. Immediately upon entering the building there is a comfortable, homelike atmosphere which puts one at ease. For conferences with parents, the principal or teachers could meet the parent here and proceed with the discussion in a friendly, relaxed surrounding.

It is just as important for the child to sense this feeling when he first enters the school, in contrast to many older buildings that present a maze of dingy corridors and cause confusion to anyone entering the building.

The entrance of the Valley Woods Elementary School is the central core of the building, with immediate access to the general purpose area, the offices, conference rooms and special spaces serving art, music and library needs.

General Purpose Area

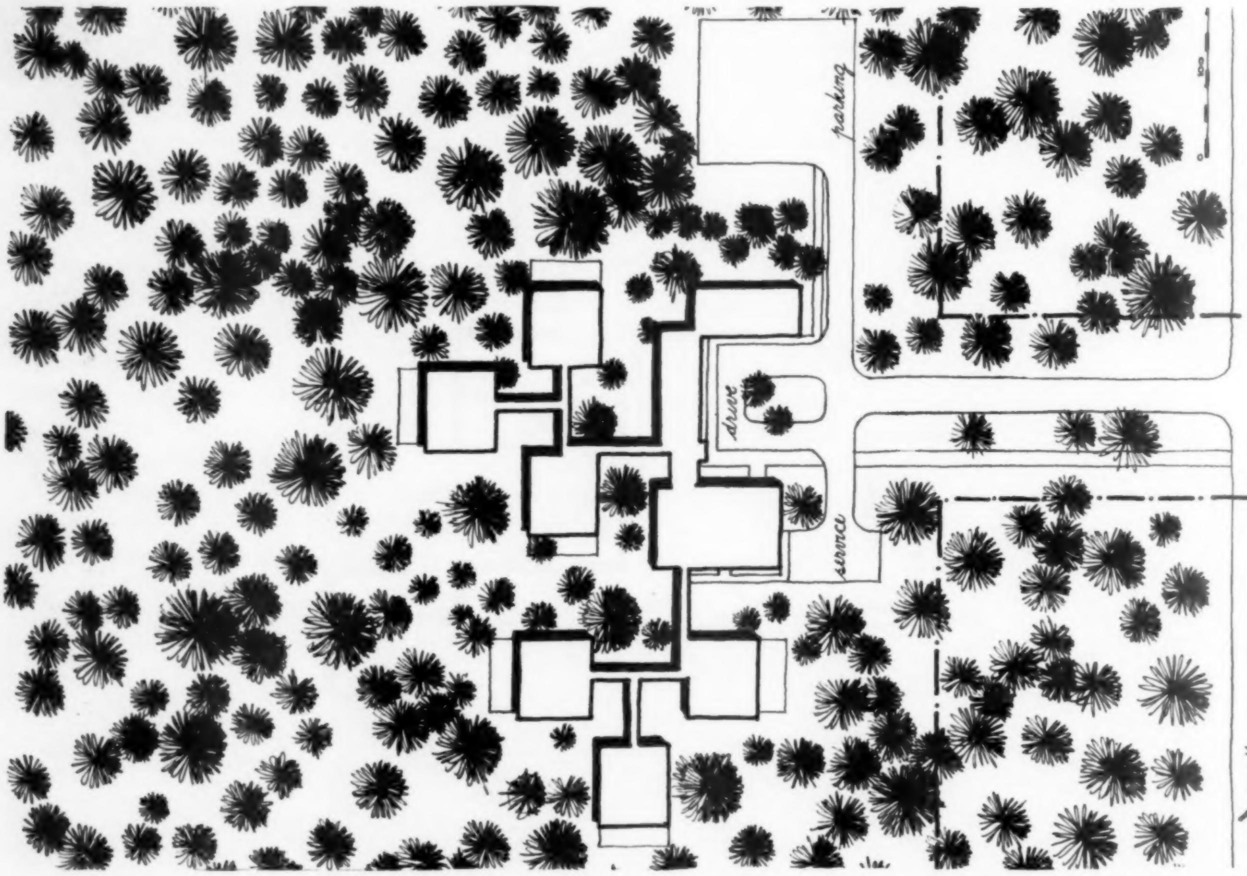
The general purpose area houses the multi-purpose room, used as a gymnasium, cafeteria and assembly area. It also includes kitchen facilities, storage room, boiler room, receiving area and fan room. At one end of the multi-purpose room there is a stage. This unit becomes the community center of the school and of the attendance area served by the school district. Assemblies, programs for the community, PTA meetings and community affairs are held extensively. Hence, it is centrally located, easily accessible and sufficiently attractive to establish a "feeling tone" for the school on the part of all who enter.

Access to Principal's Office

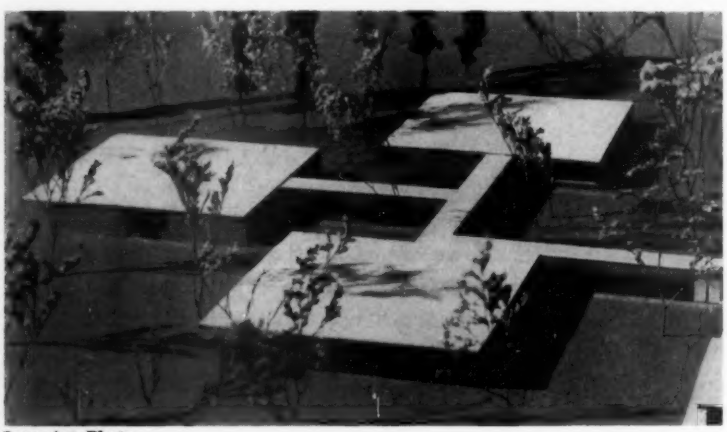
The administrative offices are situated close to the general section. When one enters the building there is immediate access to the principal's office, and the visitor is served with a minimum of inconvenience. The office unit includes a general office, principal's office, book room and a workroom for mimeographing, assembling materials and other clerical work. Off the workroom there is a lavatory to serve the general office area.

Other Administrative Areas

Adjacent to the principal's office there are conference rooms and the health center where a program is offered by the nurses, visiting teachers and speech cor-



The final site plan shows how classroom clusters with their outdoor play areas are oriented to the site and the school's relationship to traffic lanes and parking facilities.



Lens-Art Photo

Each cluster has four classrooms and houses a single grade. The individual building units are connected by enclosed glass passageways.

rectionists. Although access to these rooms by the principal is important, it is equally important for parents and pupils to be able to reach them without passing through the general office. A small waiting room accommodates these areas and toilet rooms are nearby.

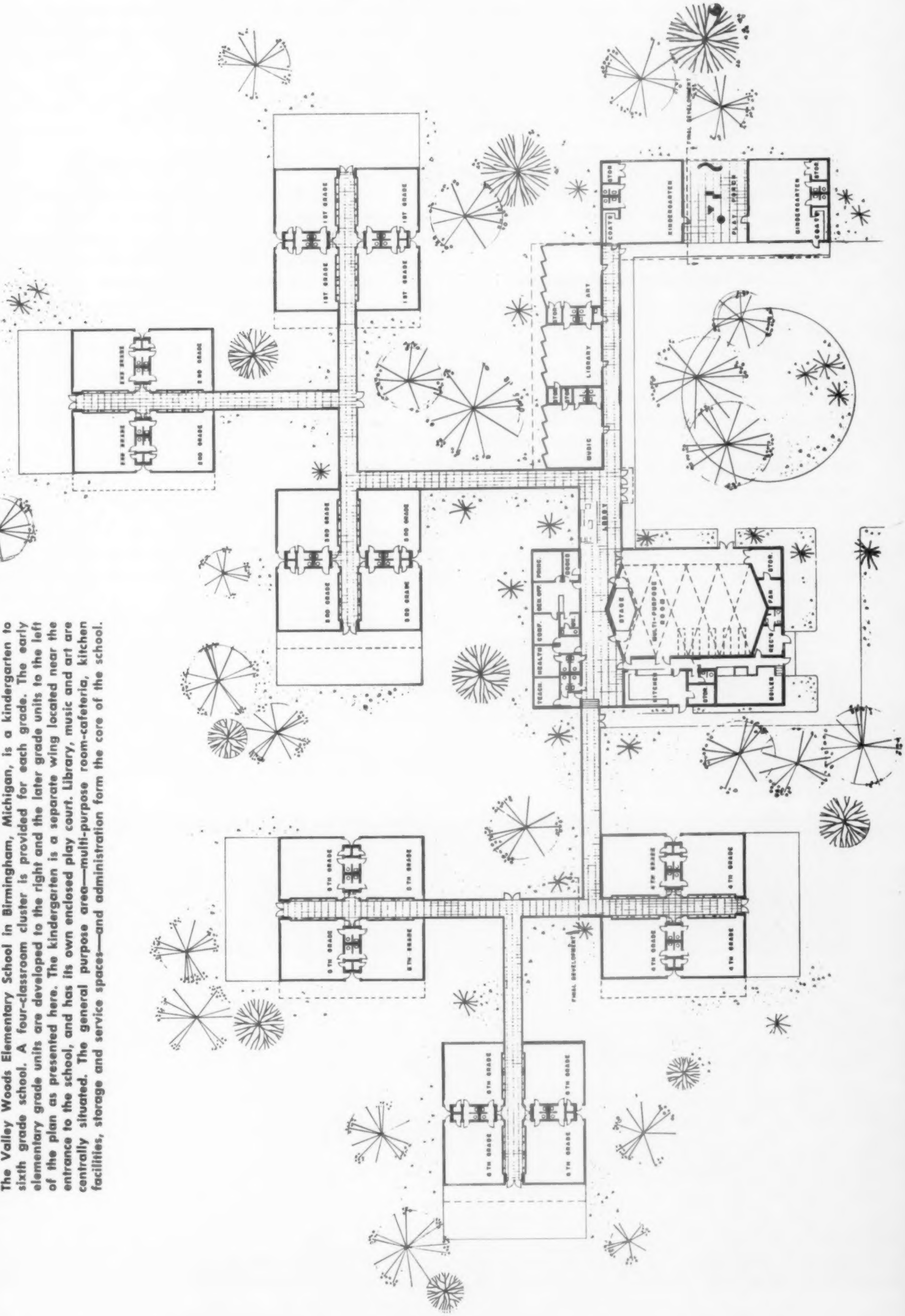
A teachers' lounge is part of the administration unit. Toilet facilities for the public are also available here for times when the multi-purpose room is in use for community activities.

It seemed logical for art, music and library facilities to be located in this general area because of the central location and easy accessibility from all the classroom clusters.

The overall design of the school, as it radiates from this central core, quickly forms a pattern. The early elementary classrooms are developed at the right, and the later elementary classrooms are developed at the left. Play spaces are readily reached from each of these areas and are designed to serve their specific needs.

Kindergarten rooms are at the side which includes the early elementary classrooms, but these rooms form a separate unit. The kindergarten program may be carried on independently without involving any other sections of the school.

The corridors which connect the classroom clusters are enclosed glass passageways with only base heat.



The Valley Woods Elementary School in Birmingham, Michigan, is a kindergarten to sixth grade school. A four-classroom cluster is provided for each grade. The early elementary grade units are developed to the right and the later grade units to the left of the plan as presented here. The kindergarten is a separate wing located near the entrance to the school, and has its own enclosed play court. Library, music and art are centrally situated. The general purpose area—multi-purpose room-cafeteria, kitchen facilities, storage and service spaces—and administration form the core of the school.

Certain specific requirements were suggested to the architect. These included: (1) a ceiling height of approximately eight feet; (2) radiant panel ceiling heat; (3) flexible classrooms of approximately 1200 square feet for kindergarten rooms, and 900 square feet for rooms serving grades one to six; (4) a central toilet core to serve two classrooms; (5) corridor coat racks (no lockers or cloak rooms); (6) a lobby area large enough to serve small group gatherings and conferences; and (7) combined use of multi-purpose room as gymnasium, cafeteria and assembly with a suggested hydraulic stage.

A Two-Room Kindergarten

The kindergarten unit has two classrooms, each of which has approximately 1200 square feet of floor space. This area is adequate for all the types of play equipment required by the kindergarten program. Each room has its cloak area, storage space and toilet. The kindergartens are completely self-contained.

Between the two rooms there is a sheltered play area for inclement days. In addition, there is a separate outdoor play area for kindergarten pupils which will not be overrun by older children. Direct access to the kindergarten unit means that these youngest children can come and go with a minimum of disturbance to the remainder of the school. Since they attend half-day sessions this is particularly advantageous.

Classrooms Are Self-Contained

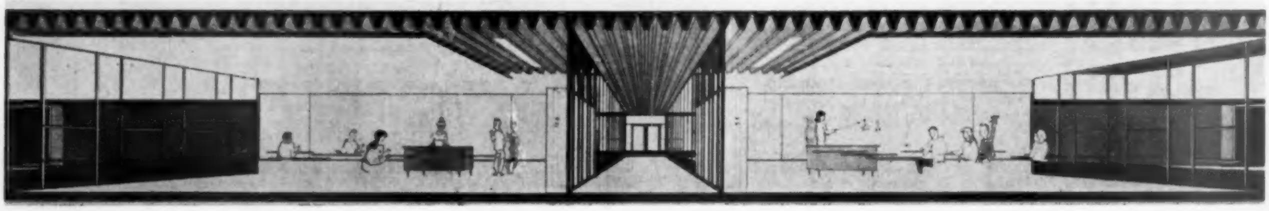
There are five of the four-classroom clusters for the older children (a total of six clusters). Each classroom provides approximately 900 square feet of floor area. Experience has long indicated that this amount of floor area is adequate for movable furniture and for centers of interest, such as a reading center, a science center, a library center, etc. Each classroom is a self-contained unit with toilet facilities, work benches, sink, bubble fountain and storage facilities for supplies.

The Feeling of Informality

To accomplish the feeling of informality through design, extreme care was given to the type of construction, selection and use of materials, and to architectural details. Basically a steel frame structure, the columns, beams, trusses and underside of the metal roof deck are all exposed. With the use of borrowed light panels in corridor walls, the ribbed ceiling can be seen as a continuous pattern extending throughout classrooms and corridors, except for a portion of each classroom which is covered by a suspended Burgess-Manning heating panel. This panel provides both heating and acoustical control, eliminates the need for floor or wall heating units, and gives maximum use of floor space.

The exterior of the classroom units is treated as a curtain wall, the light appearance of which contrasts with solid panels of brick walls. Interspersed in the curtain wall corridors are stack bond cinder block panels which offset the openness of the vision strips. Bright primary colors are introduced on doors and small wall areas, and stand out against the neutral background of floor tile, interior walls and exterior brick. The bright colors lend a sparkle that contributes to the friendliness and inviting atmosphere of this suburban community school.

Corridor between classrooms has borrowed light. Heating panels which also provide acoustical control are suspended in classrooms from the exposed ribbed ceiling.



CAMPUS GRADE SCHOOL MEETS EXPANSION IN WALDWICK, N. J.

by MORRIS KETCHUM, JR.

FAIA, Ketchum, Giná & Sharp, Architects, New York City

A native New Yorker, Mr. Ketchum gained his first architectural experience with various well known firms after graduation from the Columbia University School of Architecture. Following ten years of independent practice he entered into partnership with Francis X. Giná and Stanley Sharp in 1944. Mr. Ketchum has taught architectural design at Yale University, New York University, Cooper Union, and is presently a member of the faculty at Pratt Institute and Columbia University.

WALDWICK, New Jersey, is a fast growing suburban town of 6,000 population located within the New York metropolitan area. Like every other progressive community, it has always demanded good schools for its children.

In 1954 Waldwick's school population had far outgrown the capacity of its one elementary school where classes were being held in double sessions. The time had come to expand the town's overcrowded school plant. It was decided to plan and build another new elementary school.

Surveys indicated that the total school population of Waldwick in 1956–1957 would be 1,300 pupils in grades K–8 inclusive. Of this total, approximately 1,100 pupils would be above kindergarten age and approximately 200 of kindergarten age. Existing facilities in Waldwick's central elementary school could accommodate, at 30 pupils per classroom, 690 pupils above kindergarten age in 23 regular classrooms. Therefore, Waldwick's new school was planned to take care of the balance of 410 pupils above kindergarten age. At 30 pupils per classroom, 13 to 14 regular classrooms would be required.

The two kindergartens in the existing school could take care of 50 pupils each in two shifts of 25 pupils each, a total of 100 pupils. Therefore, the new school

Julia A. Traphagen Elementary School is the architects' translation into a living building of the educational philosophy of Waldwick, New Jersey. The new school has 14 regular classrooms and 2 kindergartens.

was planned to have two kindergartens of the same capacity to accommodate the remaining 100 pupils of kindergarten age.

It was decided that this new school, with its 14 regular classrooms and 2 kindergartens, would be located in the eastern section of Waldwick and that it would be a K–5 neighborhood school for that area. Grades 6–7–8 would continue to be housed in the existing central school. The new school, named the Julia A. Traphagen School in honor of a well beloved Waldwick teacher, now retired, was to be capable of expansion to six more regular classrooms by 1958. Beyond that point, future pupil load was to be absorbed by the construction of another new elementary school in the western section of Waldwick.

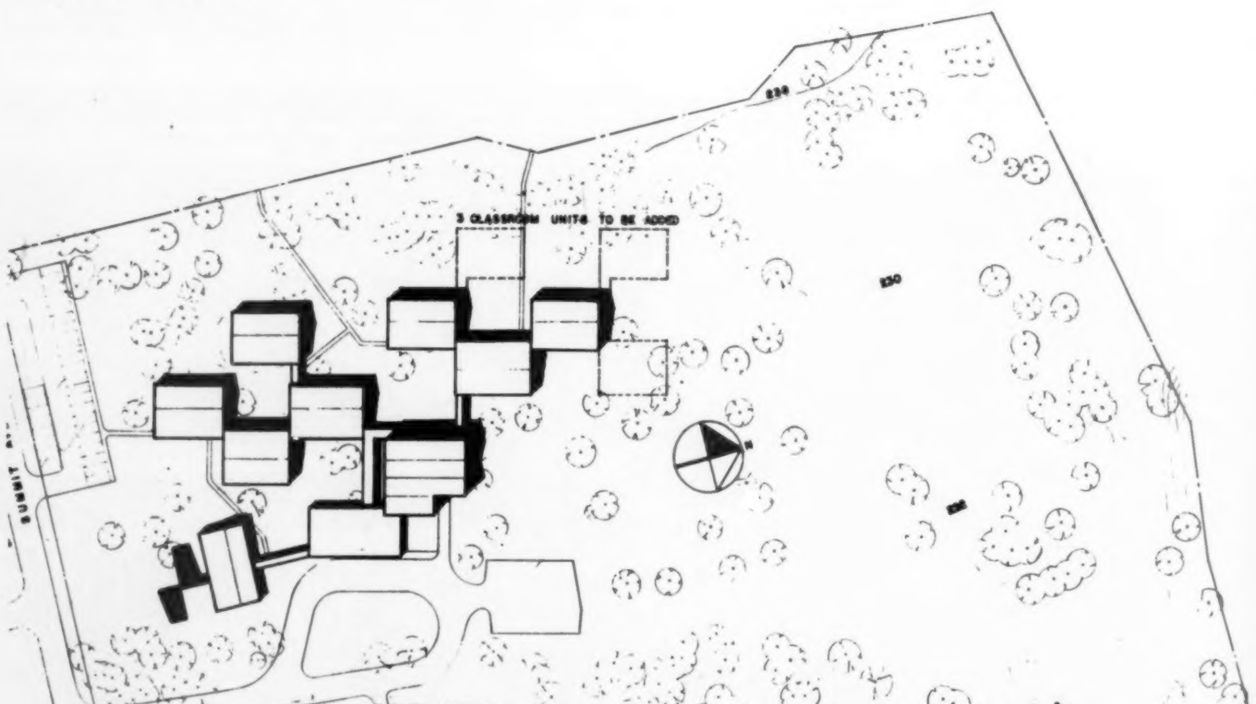
Waldwick's Educational Philosophy

The educational specification for the Julia A. Traphagen School stated the aims of Waldwick's educational philosophy clearly and concisely, as follows:

> Our education should develop in each individual the fullest participation in the democratic way of life.
>
> We should develop in each individual all of his abilities, interest and needs; and the school program should emphasize the worth of all essential work.
>
> The school program will provide our pupils with the opportunity to learn and practice

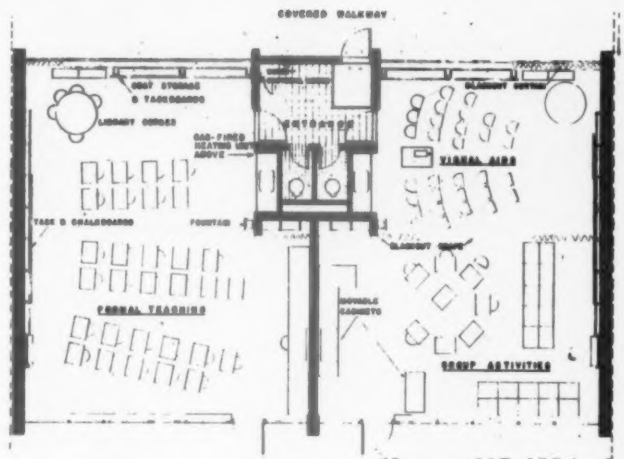
Kindergarten children enter the unit and reach their rooms through a vestibule approach.

Classroom buildings have been arranged on the site of the school to permit the addition of three more units when needed. Covered spaces and walkways link kindergarten, multi-purpose and administrative units together.



Multi-purpose unit, left, and administrative building, at right, are centrally located from the classroom buildings and kindergartens.

Typical classroom plan includes the vestibule entrance for each two rooms, with toilets just beyond. Classrooms are adaptable for formal or informal activities.



> the technics of living and working together; to make each day meaningful for every child.
>
> The school program will encourage our pupils to develop proper attitudes and habits through real life situations.
>
> The school program will develop a school curriculum that is based on understanding and not on facts alone.
>
> Teaching of facts is important and the basic skills need to be motivated by attitudes and understanding to foster individual initiative without trespassing on the common good.
>
> A child learns better when he is in a state of emotional well-being. All learning processes develop better when a child is in a healthful environment.

To carry out these objectives best, the program for the new school asked that the classrooms be complete self-contained educational units, housing all the space and equipment required for every phase of the primary educational program, including such typical group activities as music, art and handicrafts, formal activities and play activities. It also stated that each indoor classroom unit should be supplemented by sufficient outdoor teaching space, so that these activities could be conducted both inside the school and in the surrounding outdoor areas.

The School's Specialized Spaces

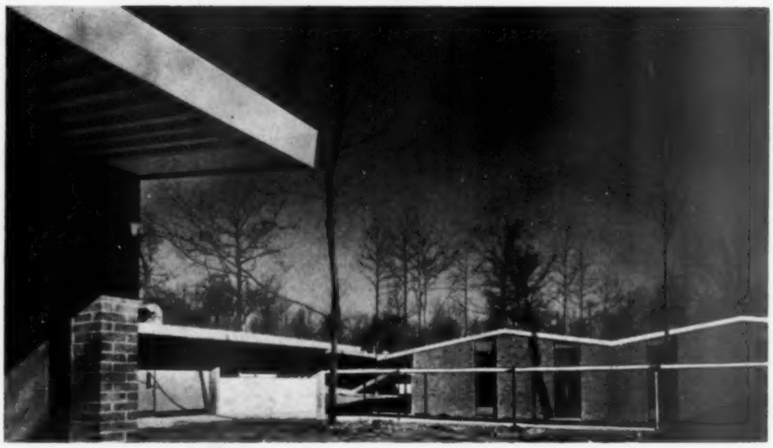
Specialized educational spaces to serve the classrooms include a general purpose area, an administrative area and outdoor facilities. The multi-purpose room was to be used as an assembly area for pupils above kindergarten age, as a music room, as a lunchroom, as an indoor playroom, as an area for small size after-school community meetings, and as an assembly area for children about to take buses. Boys' and girls' toilets, a small activity room and custodial space and storage were included in the program for this unit.

The program called for one more special activity area. This space was to be a separate indoor playroom for all organized athletics other than basketball. It was decided that basketball was not to be included in the K–5 curriculum. Unfortunately, the cost of this playroom brought the total budget for the school above the permissible borrowing power of the community. It was therefore eliminated from the final budget but planned for future construction.

The administrative area included a public reception space, secretary area, principal's office, nurse's office and clinic, a teachers work room, a conference room, storage and toilets. The adjacent outdoor facilities included a sheltered bus loading area, a parking area, a service loading platform at the custodial space, and several play areas varying in size and character in accordance with the age groups to be served.

Finally, the program called for good natural and artificial lighting, acoustics and color values, and stated

Kindergarten children are always in contact with the world about them by means of the ample window wall provisions. Classrooms, too, have similar opportunities for visual contact with the out of doors. At right is view of the court which lies between multi-purpose unit and classroom section.



that, above all, the school plant—indoors and out—should be residential rather than institutional in character.

Selecting a Suitable Site

The board of education selected a 13 acre sloping site in the eastern part of Waldwick near the center of the town's most densely populated area. It was heavily wooded with many large size trees well worth preserving. Since the land sloped gently downward from west to east, a natural shield was provided against the hot rays of the western sun.

It was found that the soil conditions at the site provided good bearing for foundations and that there were no hidden rock ledges. Against this, a great deal of surface water coursed down the hillside, especially on the two unpaved streets leading into the property, so that special provisions for surface drainage were obviously necessary. All in all, however, it was an unusually attractive site, suited to the size and scope of the school building program.

Architects Are Chosen

The board selected its architects after screening and interviewing a great many possible candidates. Our firm was selected on our record in the school field and particularly for the fact that we had designed one of the first cluster type schools—The Hollow Tree School in Darien, Connecticut. With the consent of the board, we associated on this project with our late friend and fellow architect, Jay C. Van Nuys, of Somerville, New Jersey. In developing the project, I was the partner-in-charge

and David Tukey, of our firm, was the staff architect.

Gaining Support for the Project

At the start of the project, Robert Young was president of the board of education. His leadership of the board and his influence in the community were invaluable aids in securing popular support for the plans for the new cluster type school. On December 15, 1954, the voters of Waldwick approved a bond issue of $475,000 by a vote of approximately seven to one. Later on, after Bob Young had moved to another town, he was succeeded by Douglas Dickey as president. Again, the president's active interest and loyal support helped, during the construction stage, to make final realization of this project possible.

During the planning and construction stages we worked, first, with Frank Workman, principal of the central school, and later with Dr. John Finnessey, after his appointment as superintendent of schools. Both educators gave us invaluable collaboration.

Plan and Design of Classrooms

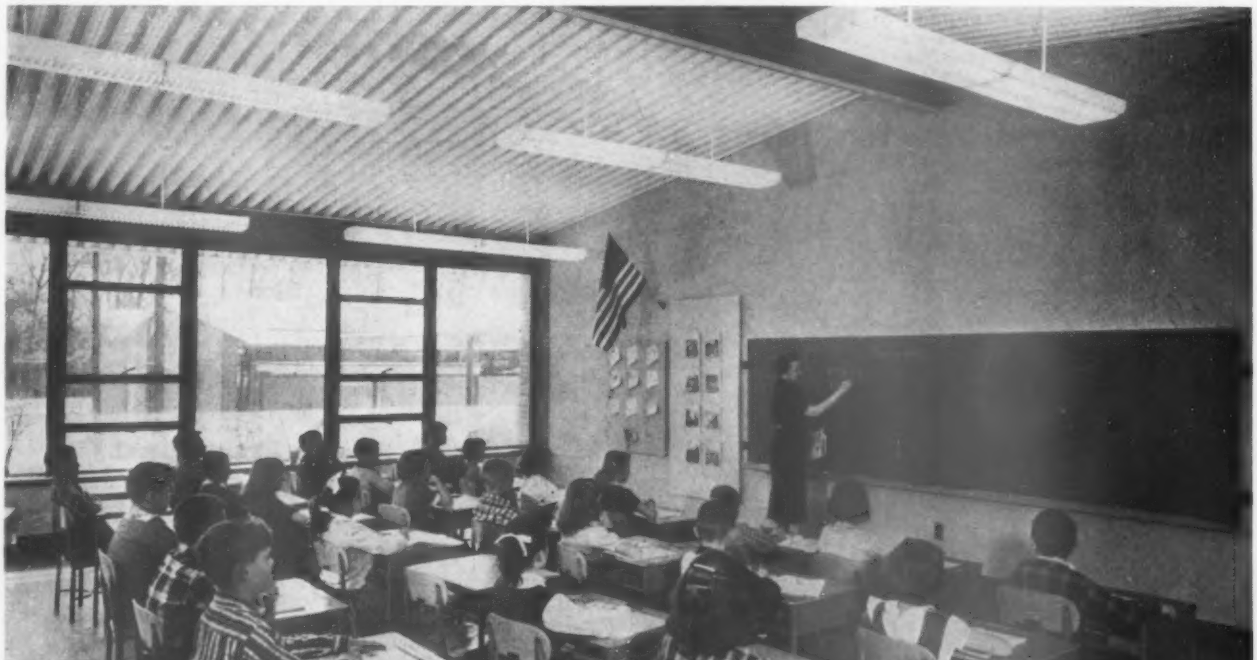
Our architectural solution was based on the character of the classrooms as described in the educational program. We designed each classroom as a self-contained unit, with space and equipment for the varied activities of the teaching program. Then we arranged these classrooms, two by two, in separate building units, adding individual toilets for boys and girls off an entrance vestibule.

East and west windows provide ideal natural light and cross ventilation. On one side, low-silled windows and exit doors face the outdoor teaching space which, in good weather, becomes part of the classroom. On the other side, high-silled windows give privacy and noise protection along the covered walkway. Below these window sills are lift-up panels used as tackboards and as cover panels for storage units.

Over each pair of classrooms we placed a gable roof with a low slope. This type of roof was used instead of a flat roof for two reasons: *first*, a provision of the New Jersey "Guide for Schoolhouse Planning and Construction," as then written, provided that classrooms with bilateral lighting must have an average ceiling height of 10′–6″ and that at no point could the ceiling height be less than 9′–0″. With this limitation, a sloping roof enabled us to design a classroom building with lower window walls than a flat roof would permit. Obviously, cubage and cubage cost were saved by the use of a sloping roof.

Second, the use of a sloping roof permitted us to carry the roof over and beyond the low-silled glass wall of the classrooms to provide better sun and sky-glare protection than would be possible with a flat roof. On the opposite side, we carried an even deeper projection to cover the walkway. *Third*, the sloping roofs of the

Spelling lesson at the chalkboard requires formal arrangement of furniture in versatile classroom of the Julia Traphagen School. Sloping roof means low window walls.



Administration unit of the school houses public reception area, secretarial space, offices and all the special function rooms needed.

All photos by Ben Schnall

school buildings help to create a desired residential character.

The two kindergartens were placed in an almost similar building unit. Interior details were varied to meet the specialized requirements of kindergarten activities. Outdoors, there is a trefoil shaped play area.

Building for Multi-Use

The multi-purpose building is the hub of the school plan. Its one large room is planned for assembly, lunch, music and informal indoor play. There is a folding stage, fold-up tables and a storage space for chairs.

Tackboard panels within the classrooms conceal wardrobe spaces. When raised, they serve to black out the windows for visual aids programs. Storage shelves are concealed in the same way.

Adjacent to this room are toilets for boys and girls, a smaller lobby also used as an activity room, a custodial office and a general storage room. Service deliveries are made at a truck loading platform off the storage room.

This building unit is capable of expansion. In addition to a future playroom, part of the indoor space can be enlarged and converted into a kitchen should a hot lunch program ever be planned. The storage and custodial area can also be enlarged.

The multi-purpose building is linked to the administrative unit by a covered bus loading platform. Within the administrative building are the public reception area, secretarial space and all the special function rooms and spaces required in the educational program.

The kindergarten building is also linked to the administrative building by a covered walkway. It is given southern exposure and has a relatively isolated location.

The covered spaces and walkways that tie the kindergarten, administration and multi-purpose units together are part of the site planning solution for the entire school. All classroom buildings have an east-west orientation. They have been placed with their greater dimension and roof slopes parallel to the slope of the hillside.

All buildings, including the kindergarten unit, vary in elevation to suit existing grades, thus minimizing excavation and fill. The classroom buildings have been arranged around pleasant outdoor quadrangles, always with an open space at one corner of the quadrangle.

School's Traffic Pattern

The traffic pattern for the school was studied carefully. Buses, staff and public motor traffic and service trucks enter the main driveway from Summit Avenue. Buses use the traffic circle, parking at the bus loading platform. Staff cars have their own parking area. Trucks stop at the service loading dock.

Parents bringing their children to school or picking them up after school hours will soon have their own entrance drive and parking area off Summit Avenue, in direct contact with the main east-west covered walkway. Students on bicycles will also use this entrance, parking their bicycles on the north side of the driveway. The two main types of outside traffic will thus be separated, minimizing the danger of accidents and congestion.

Covered Walkways for Protection

Within the school grounds, foot traffic is protected from rain or snow by the covered walkways. These connect classroom buildings to the multi-purpose unit and, in turn, to the administrative unit and the bus loading platform. The closely related buildings cut walking distances to a minimum. At the same time, the need for walking is cut down by the fact that all rooms are self-contained educational units and the children seldom leave them. When they do, they find storage shelves and coat racks in the multi-purpose building for their outer clothing. The need for staff foot traffic is lessened with the help of an intercommunication system.

Within the school grounds foot traffic is protected from rain or snow by the covered walkways. However, the closely related buildings cut such traffic to a minimum.

The entire school was placed near the southern boundary of the site, leaving the northern acreage free for development for outdoor activities and nature study.

Central vs. Unit Heating

It was originally planned to heat the Traphagen School with a central steam plant in the multi-purpose building and underground pipe lines leading from this plant to all buildings. After final construction estimates were received, the total costs were approximately $32,000 over the final budget. The architects and Tectonic Associates, their consulting mechanical engineers, then investigated the possibility of using separate heating units for each building. It was found that the school could be efficiently and inexpensively heated with individual gas-fired heating units, thus eliminating the need for a central boiler plant and underground connections.

Each heating unit is located above the toilet space in the classroom buildings and in a heating room in the multi-purpose building. The units heat air that is circulated and recirculated through underfloor ducts in each room. Fresh air is obtained through roof vents. The school's heating system was thus simplified and improved, and the total cost for the entire project was brought back within the budget.

Every building unit in the cluster plan of the Traphagen School has the same basic structure and materials. Floors are concrete slabs poured on grade. Finish floors are asphalt tile. Roofs are carried on load-bearing walls that support a series of steel roof beams.

Roofs and Walls

The roofs themselves are made up of Robinson Q-deck panels, left exposed below and finished above with insulation panels and built-up roofing, topped by slag and white marble chip finish. Walls are cavity-type masonry. End walls are reddish brown brick outside, painted waylite block inside.

The roof slope of the classroom buildings is repeated, in tandem form, for the multi-purpose building thus keeping this larger building unit in scale with the smaller classroom buildings. The administrative unit and the bus loading area are covered with a flat roof.

Individuality Through Color

Indoors and out, walls other than brick, roof beams, roof soffits and steel columns are painted in gay color schemes that are alternated in series. Each classroom or special purpose room or space has its own color theme and its own individuality, yet few basic colors are used. Further development of this visual variety within a uniform architectural scheme will be achieved when each of the classroom quadrangles is given a special flowering tree—a magnolia in one quadrangle, an

apple in another, a dogwood in a third, and so on. Together with the survivors of the original forest trees, this will provide a unique setting for an unusual school for elementary grades.

Final Facts and Figures

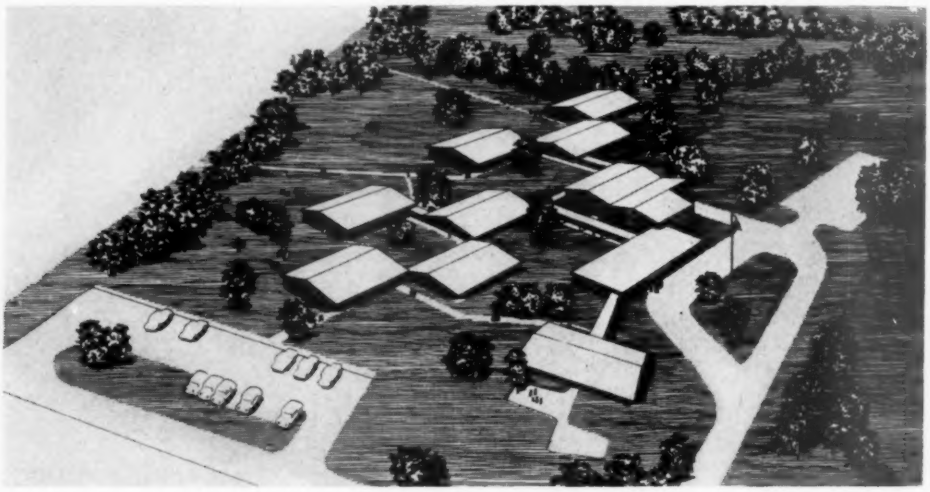
Final costs for this school plant were $14.73 per square foot, as against the average cost of school building in Bergen County of $16.00 per square foot. The building cost was $383,153.00 and the total project amounted to $483,250.00.

Before the school was opened in September, 1956, the school population of Waldwick had reached expected 1958 totals, so six new classrooms in three new classroom buildings were started and are now under construction. Their cost is only a little more per square foot than the original units, in spite of a 4 percent rise in building prices.

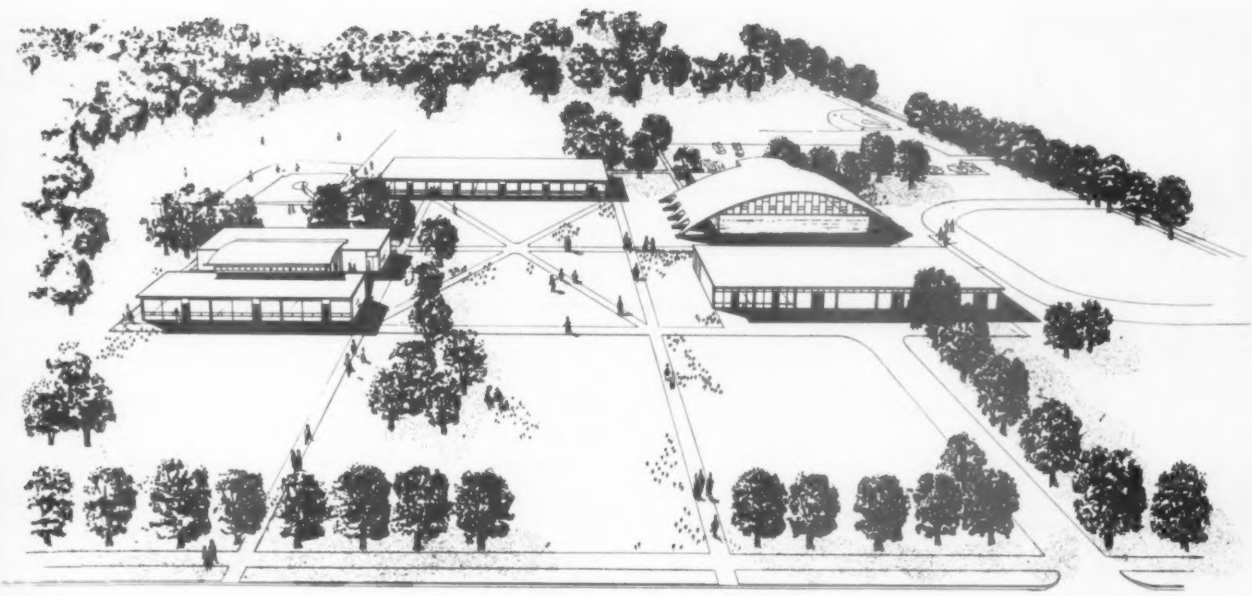
Economically, the plan of the Julia A. Traphagen School reduces to a minimum conventional non-productive corridor space, requiring expensive construction, heating and maintenance dollars. Usually, planners are satisfied to have 55 percent of indoor building space used for actual teaching. In this school, approximately 75 percent of total enclosed space is "live" space actually used for teaching.

Additional savings were gained by site planning that cut down grading and excavation. Finally, by using simple, repetitive one-floor construction, the heavier, more expensive construction required for conventional multi-floor schools was eliminated. The advantages gained included minimum fire hazards, a low fire insurance rate, lower cost of cleaning and maintenance.

A new school, similar to the Traphagen School, is now under way for the western section of Waldwick. The community, children and teachers of Waldwick have shown themselves to be well satisfied with cluster type schools.



Multi-purpose unit is tallest building within the total school plan, and repeats the sloping roof design of the classrooms and kindergarten. Administration building has a flat roof.



Central Elementary School has been designed for Columbus, Kansas, by the firm of Hellmuth, Obata & Kassabaum, Inc., and the plant is now under construction.

PLANNING TWO ELEMENTARY SCHOOLS ON A TIGHT BUDGET

by STANTON LEGGETT

Engelhardt, Engelhardt, Leggett and Cornell, Educational Consultants, New York City

THE problem at Columbus, Kansas, was the familiar one: space vs. budget. Two schools were to be built at once. One was Park Elementary for grades K through 5, with one classroom per grade and eating facilities. The other, Central Elementary, was to include both a neighborhood school (grades 1–5), but without a kindergarten; and a nine-classroom upper school (grades 6–8); plus a gymnasium, assembly space, cafeteria, areas for music, shop and homemaking. All-purpose rooms were originally desired in all schools, and teachers' rooms were needed. Staff workrooms were also considered essential. Administrative offices were to be provided at Central Elementary.

The educational specifications, prepared early in February, 1956, called for 900-square-foot classrooms and a 1,000-square-foot kindergarten at Park School. The gross area then called for was 9,000 square feet at Park, 39,600 at Central. Concerned about rising costs, the consultants suggested ways of combining uses and reducing areas, some of them advisable only as last resorts if bids should come in unduly high. But all were frankly presented; there was every advantage in full understanding. The least harmful ways of reducing area were:

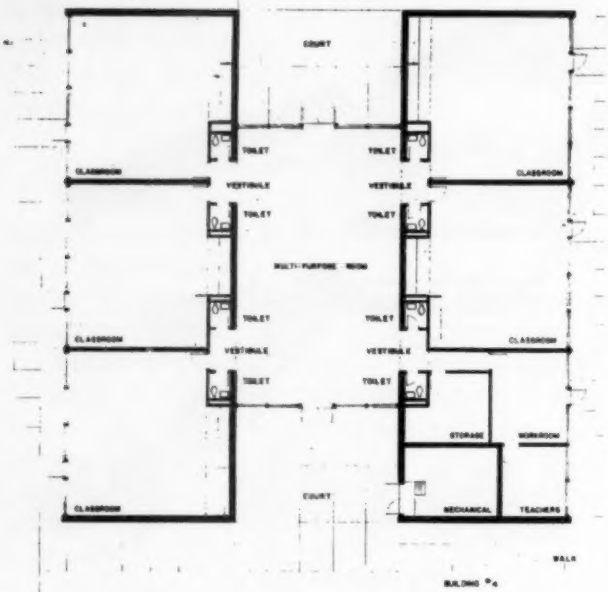
1. Eliminate corridors completely, using outdoor walkways.

2. Provide homemaking and shop facilities in the upper school's all-purpose room or cafeteria, rather than in separate rooms, using alcoves for equipment and storage.

3. Reduce classroom sizes to 800 square feet each since the all-purpose rooms could be adjacent to many classrooms and could be designed as extensions of the classroom area.

The cuts thought less desirable, though possible, included:

4. Eliminate all-purpose spaces in each building. A cut of doubtful value in view of the fact that, if these



This unit of the Central Elementary School has five classrooms opening onto a central multi-purpose room. Unit includes vestibules and toilets for the classrooms.

were retained, they could also serve the limited needs for indoor corridors in elementary school buildings having virtually self-contained classrooms.

5. Eliminate the cafeteria, providing kitchens and transporting food; and using the gym rather than the cafeteria for assemblies.

6. Eliminate—or hold for future construction—the entire lower school unit at Central School.

Contributions for Economy

As design studies proceeded, the board of education, the architects and the consultants all contributed to the economy of the final result. The board, feeling that it was important to reduce initial construction expense even at the cost of higher maintenance, accepted less costly finishes and surfacings. They planned in advance in other ways: much new equipment of fair quality had recently been installed in existing schools—refrigerator, range, washer and dryer in the home economics room, freezer and refrigerator in the cafeteria, shop equipment, even lighting fixtures—and these are to be transferred to the new Central building.

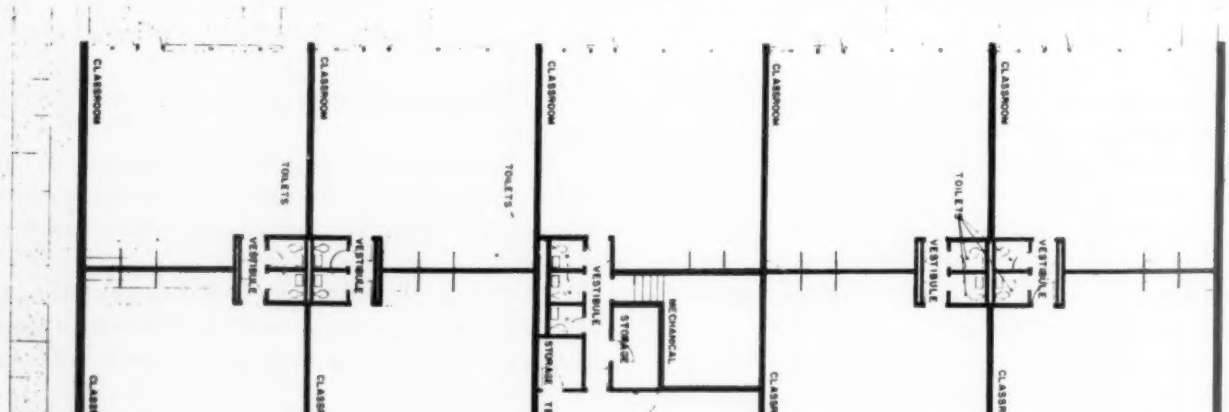
Out of the discussions between consultants, school staff and architects developed plans for a series of small, almost completely corridorless buildings for Central School, each with its own heating plant. The small size of the buildings made this more economical than a central heating system, since the individual heating plants could be little more than residential units. For all but one of the classroom buildings of both schools, it was found possible to retain the central all-purpose rooms; and all the classrooms were made identical, 820 square feet in area, with pairs of individual toilets economically arranged.

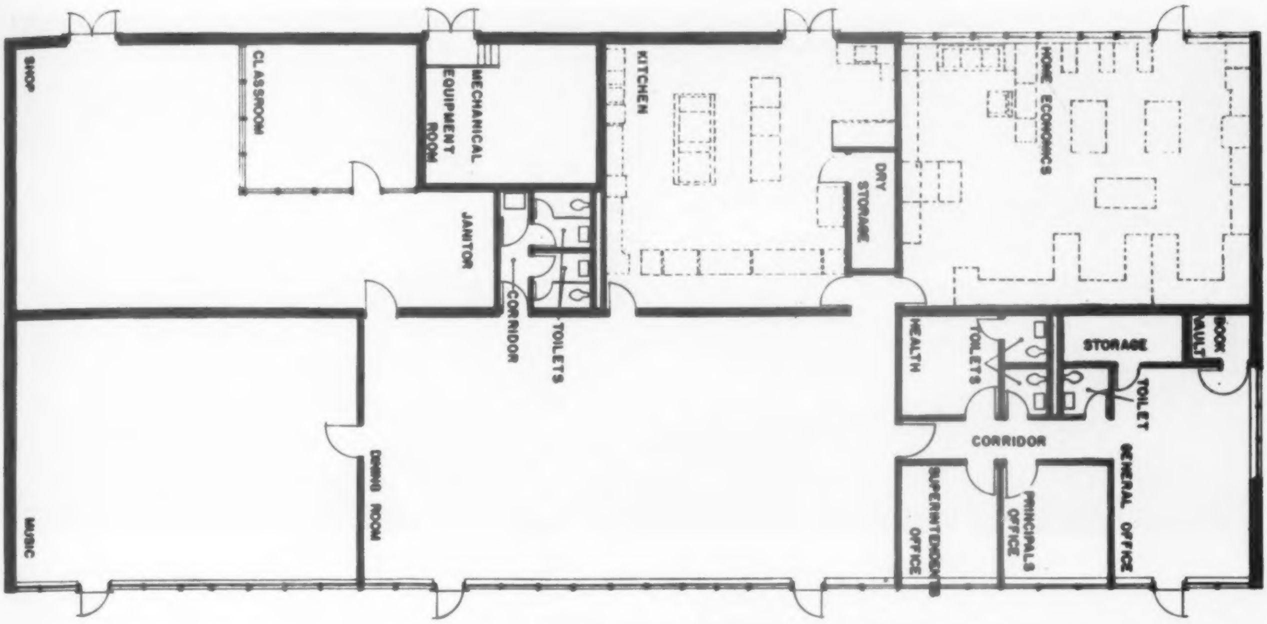
In the buildings containing all-purpose rooms, the toilets, small vestibules and classroom cabinets are arranged along interior masonry bearing walls to help keep noise from the all-purpose rooms out of classrooms. All the lower-grade classrooms have sinks built into these counters. Piping, sewage, and heating lines are straight, simple and therefore economical.

Features Are Retained

The savings produced by this concentration on the essentials, this elimination not only of "frills" but even of items which in the budget had been called necessities, were great enough to permit keeping several features which might otherwise have been given up. For instance, it was possible to provide separate shop, homemaking and music rooms; the cafeteria and kitchens were retained; and it was feasible to build the entire set of buildings for both schools instead of deferring one unit. In addition to the design factors previously mentioned, a standard construction module, derived from

Another unit of the Central School has 9 classrooms and ancillary areas.



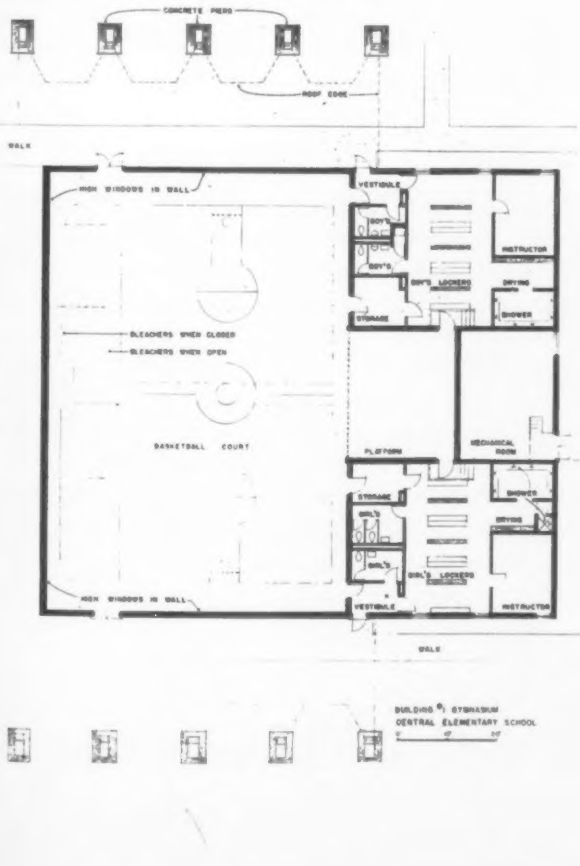


Administrative areas, music room, dining room, a shop, kitchen, home economics and storage spaces are included in this building of the Central School.

the repeated standard classroom dimensions and applied to window-wall units, roof framing, etc., helped a great deal in keeping the cost within bounds.

In the gymnasium building, a simple platform stage makes the large space usable as an auditorium—which is not at all out of the ordinary except that backstage access is through the boys' and girls' locker rooms; the locker rooms can thus double for stage dressing

Gymnasium building of Central School has portable bleachers for spectators and a platform stage.



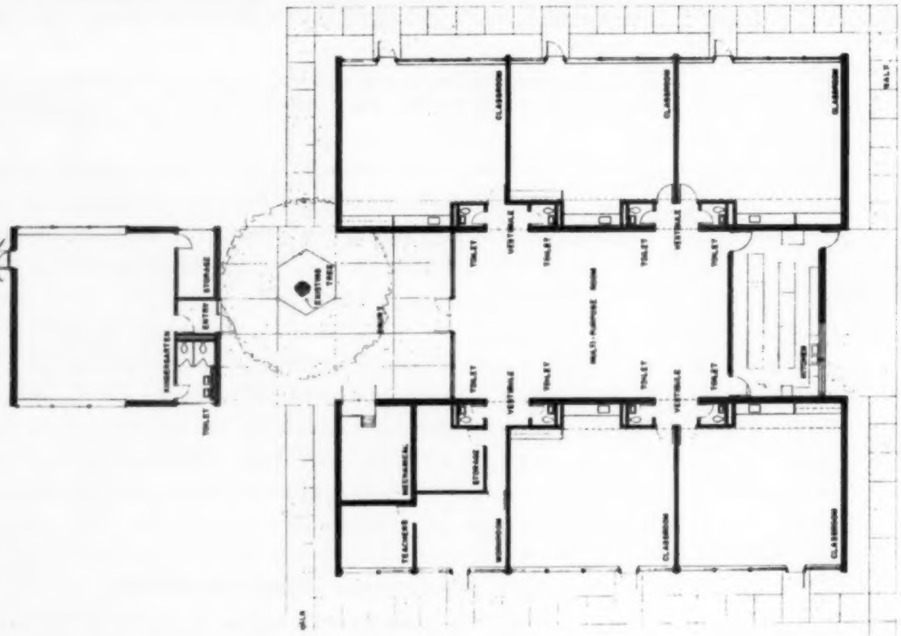
rooms, and circulation within the entire building is improved without complicating the plan. Careful study of the designs will reveal many devices of this sort, simple ideas which enhance the use of the buildings and at the same time keep the cost down.

All in all, the gross area was reduced from the 48,600 square feet called for in the educational specifications to something over 42,000. As for cost, the building is now being built for $10.80 per square foot, exclusive of fees and site work, and including only built-in equipment. This practically hits the $500,000 budget on the nose.

Action at Citizen Meetings

The designers believe one of the reasons this was achievable was the confidence which the board and the community came to place in their architects, and the awareness of the value of good architecture which they developed. One of the factors behind this understanding was the architects' frankness and full discussion of ideas. As an example, when during the early stages of the work, a citizen arose in public meeting to air his doubts and ask what the buildings would look like, one of the architects turned to a blackboard on the stage and, with chalk, sketched one of the buildings as it might be built from plans that had thus far been developed. He explained as he drew, pointed out probable changes, answered further questions—in short, let the lay audience see exactly how the mystifying process of design actually worked.

When the questions were answered, the applause was hearty, and through the audience ran a pleased buzz of conversations with friends and neighbors, intermingled with approving chuckles. The townspeople



Rendering, above, of the Park School for Columbus, Kansas, was made at an early stage of design. Court at the side of the classroom building was later eliminated. Plan at left is the final version of the school, also designed by Hellmuth, Obata & Kassabaum, Inc., architects of St. Louis, Missouri. Kindergarten is separate from the remainder of the school. Main building has five classrooms, a multi-purpose room, vestibules, toilets, teachers room, workroom, mechanical room and a storage area.

were satisfied that these professionals whom their board had hired were really looking after all their interests.

Realistic Specifications

Another circumstance which helped to hold down cost was the fact that the educational specifications were realistic from the start. The cuts that were necessary were made at the beginning before the buildings were designed, which is much easier than cutting after bids have been taken.

The architects, Hellmuth, Obata & Kassabaum, Inc., have continuously held as their objective, despite the need for rigid economy, a pair of schools attractive in appearance, pleasant to work in, functionally efficient and as economical as possible to maintain. They have been careful in designing façades, in proportioning, in choosing sizes and shapes of brick areas, of expanses of glass; in placing courtyards and entire buildings in relation to each other. They know it doesn't require a single brick more to build a good-looking wall than an awkward, ugly one; that a roof line can be at once clean, elegant and inexpensive; that the lamella roof selected for the gymnasium is both an economical and an attractive way of covering this large space.

NEW LONDON CONSTRUCTS A HOME SCHOOL

by JOHN F. MURPHY

Superintendent of Schools, New London, Connecticut

Mr. Murphy has a B.Ph. degree from Providence College and later did graduate work at Columbia University. He has a law degree from St. John's Law School and an M.A. from New York University. He began his teaching career in Pawling, New York and later went to Harrison, New York, in a similar position. He was appointed assistant principal at Valley Stream Central High School, New York, after teaching history and commercial law there. In 1941 Mr. Murphy became superintendent of schools at Torrington, Connecticut, his home town. He accepted his post at New London in 1955. Mr. Murphy is also a lecturer in School Law at Fairfield University.

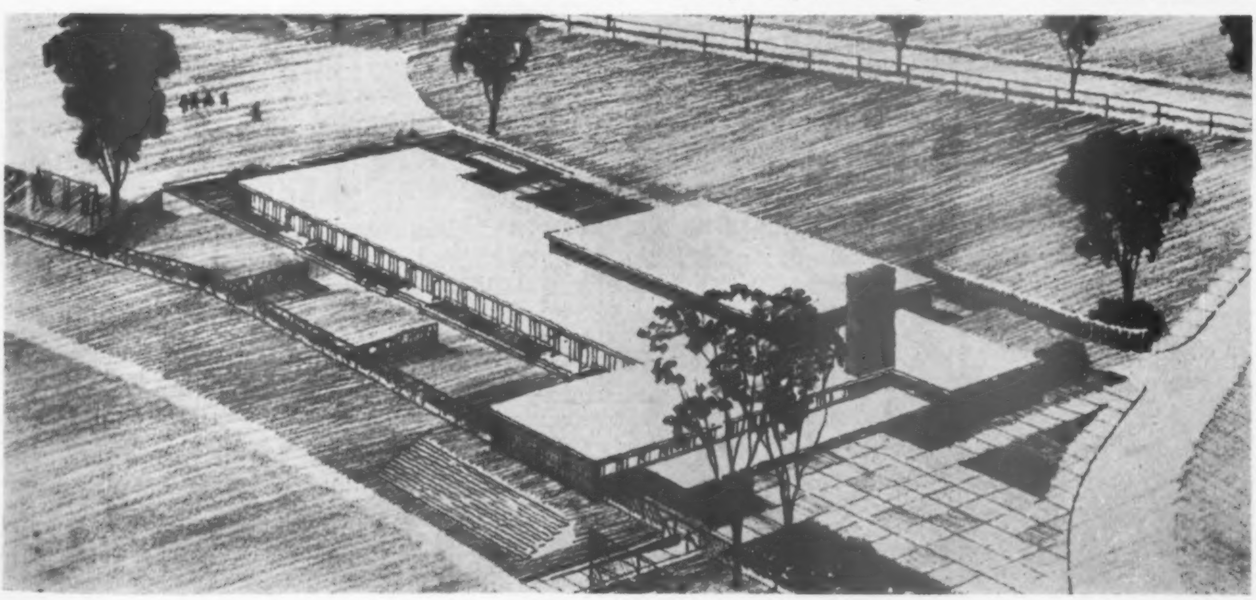
N. L. ENGELHARDT, SR., New London's educational consultant for this project—a man with a flair for inventiveness—originated the home school concept. As its name suggests, its purpose is to provide for children in a school on a limited site and, at the same time, keep them near their homes. The school is for children in kindergarten and grades one, two and three. A separate unit, it provides them with realistic school experiences at their own level.

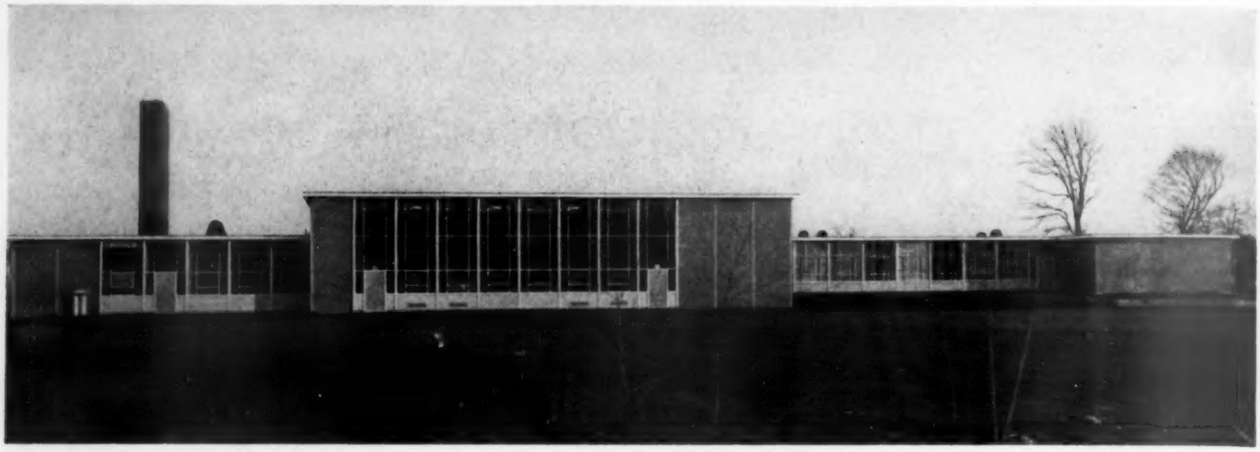
While the school may be considered a "feeder" school, its facilities are not intended to be a duplication of something already in existence in surrounding elementary schools but, rather, to improve on them by virtue of the home school's idea of *oneness.*

The New London Board of Education has educational goals. It wants all of its children to help shape their own destinies. It wants them to know, as well as possible, the ways the educational road must fork, and how to follow the turns by themselves. The goal is for children to have some index of accomplishment not dependent on the attitudes of older children, an achievement which is tangible and concrete *by itself.*

New London is a narrow strip along the delta of the Thames River. It is a venerable city (founded in 1646) with a shortage of land for development. Most of its schools were built before 1900 and on small plots. In 1954, when three new housing developments crowded one of the school districts, the Board of Edu-

New London's home school is a separate unit from the adjoining community fieldhouse. The two were designed by Fred S. Langdon and The Malmfeldt Associates.





All-purpose room has a high window, with two doors leading to the outdoors. The administration and kindergarten areas are at right, kitchen and boiler room at left.

cation, forced to build on a small site, planned the construction of its first home school, the Edgerton School.

Less Area Is Required

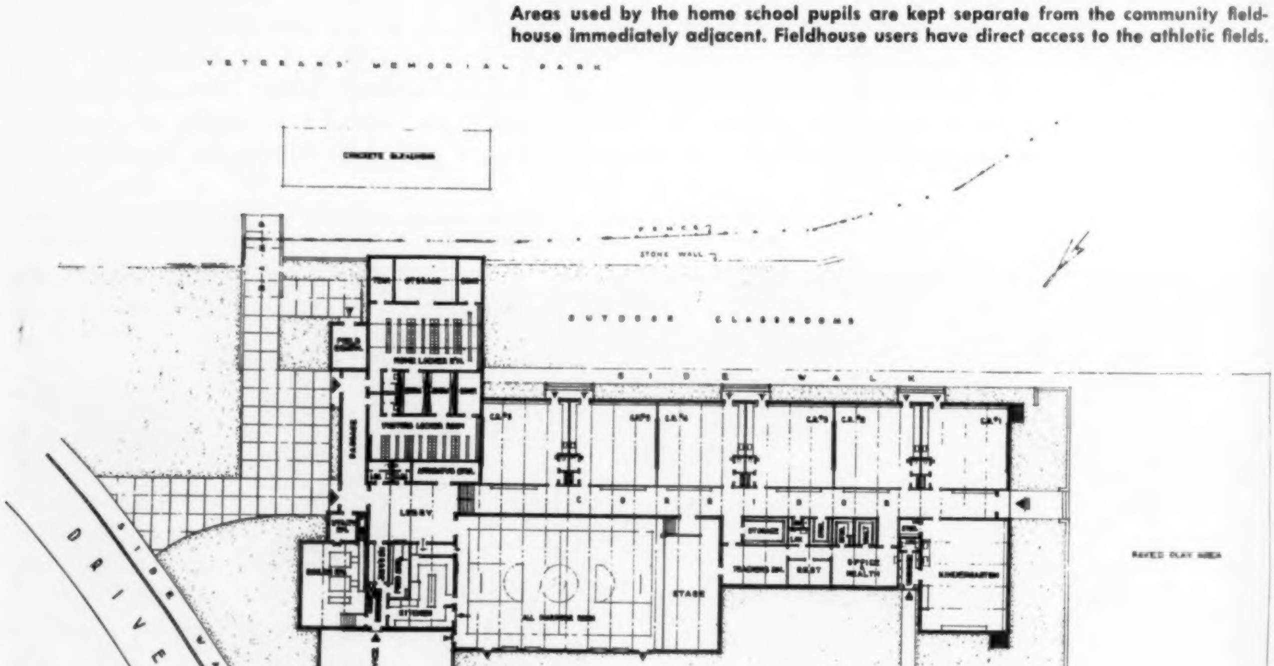
The home school requires less area because the building is relatively small. It accommodates 200 to 250 pupils. It does not have an extensive playground or gymnasium. There is limited space for the kindergarten and primary play area, plus outdoor classroom space and a landscaped area with outdoor gardens for nature study. This is all that is needed, except space for the building itself.

The Edgerton School is a one story structure. It is not temporary, but is fire-resistant and permanent. The school has seven classrooms, an all-purpose room for assembly, play and lunch purposes, a kitchen, teachers' restroom and lunchroom, an office with adjoining health provisions, storage facilities for educational and custodial uses, and a utility services area.

Community Fieldhouse Adjoins

Incorporated in the building, yet separate from its teaching area, is a community fieldhouse with dressing room facilities for the athletic teams of the high school and their opponents. The adjoining field is used for

Areas used by the home school pupils are kept separate from the community fieldhouse immediately adjacent. Fieldhouse users have direct access to the athletic fields.



Children enjoy a game of "pick up sticks" in the outdoor classroom which is just outside their room. Large window areas are shaded with Venetian blinds.

Each grade of the Edgerton School has an outdoor activity space just beyond the doorway. There is also a garden for each grade, donated by a local firm.

interscholastic sports competition. The fieldhouse is in use mostly after hours when classes in the home school have been dismissed. It is partitioned off from the home school by a folding gate. A connecting ramp and entrance to the playing field were constructed when the school building was erected.

Utility services for both the school and the community fieldhouse are centralized in the basement of the building. The adjoining field, known in New London as Veteran's Memorial Field, is used in the summer months by an organized group of amateur baseball players and they, too, use the facilities of the community fieldhouse.

Primary Children Benefit

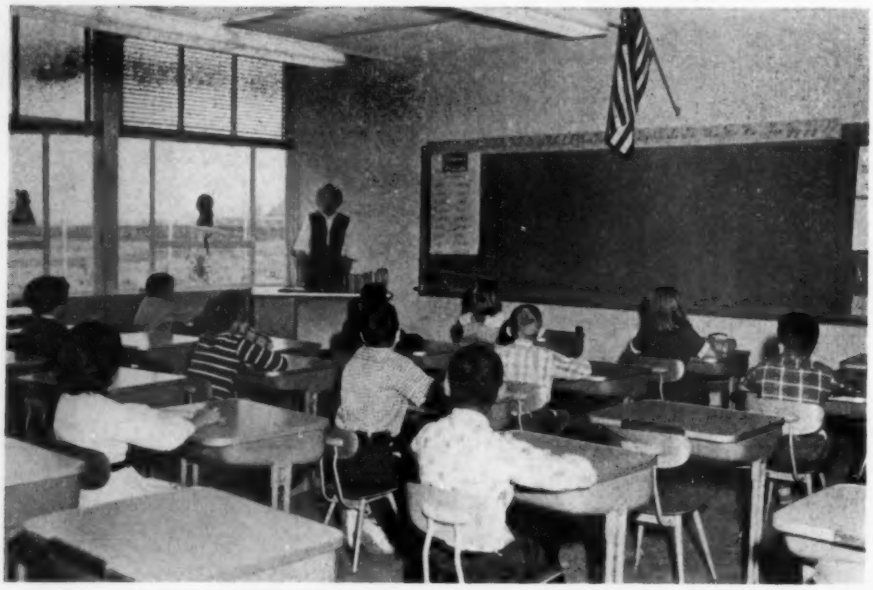
The home school is advantageous because of its direct benefit to primary children. It places each child in an educational setting which gives that child his best opportunity to achieve best results. The home school brings parents and teachers together more often. Progress in learning is carefully watched by both. The transition from home to school seems to become easier because the Edgerton School makes a real effort to utilize the school as a center for frequent neighborhood meetings.

The curriculum stresses the importance of helping children acquire the disciplines and ideas which are fundamental to life in a democratic society. The method of teaching consists chiefly in providing materials, experiences and the wholesome environment which become the stage for work and play. The basic element is social placement of a gregarious and cooperative nature. This atmosphere promotes better understandings and relations.

Complete Kindergarten Facilities

The kindergarten has an area of approximately 1,000 square feet. The primary classrooms each have an area of about 800 square feet. The kindergarten has subordinate spaces—personal hygiene, storage space and a cloakroom. In New London the optimum size of a kindergarten class is thirty pupils. The space for kindergarten pupils consists of one major area within the building and an outdoor area.

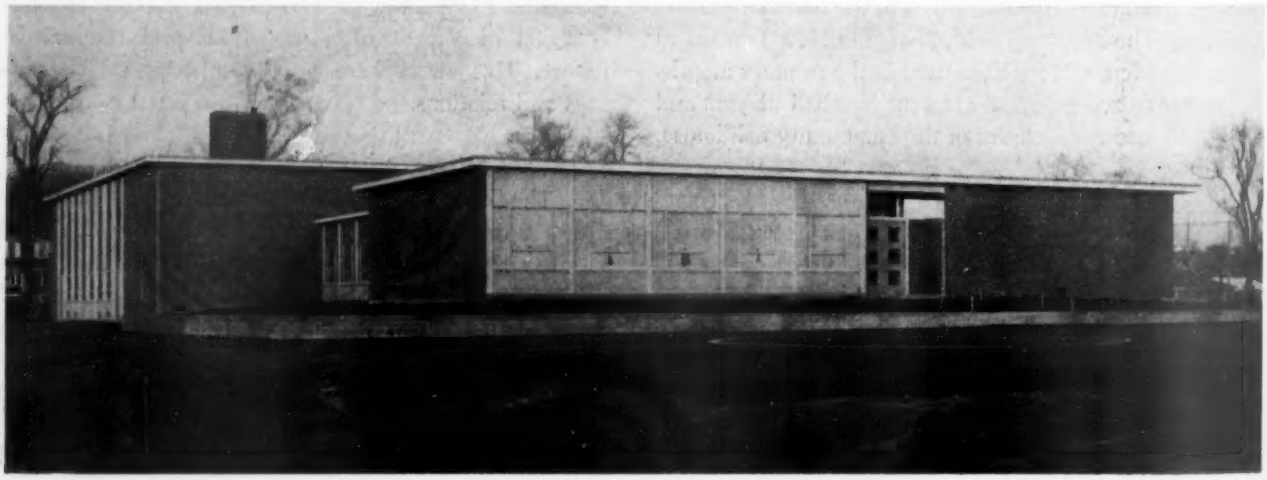
The kindergarten is located for a southwest and

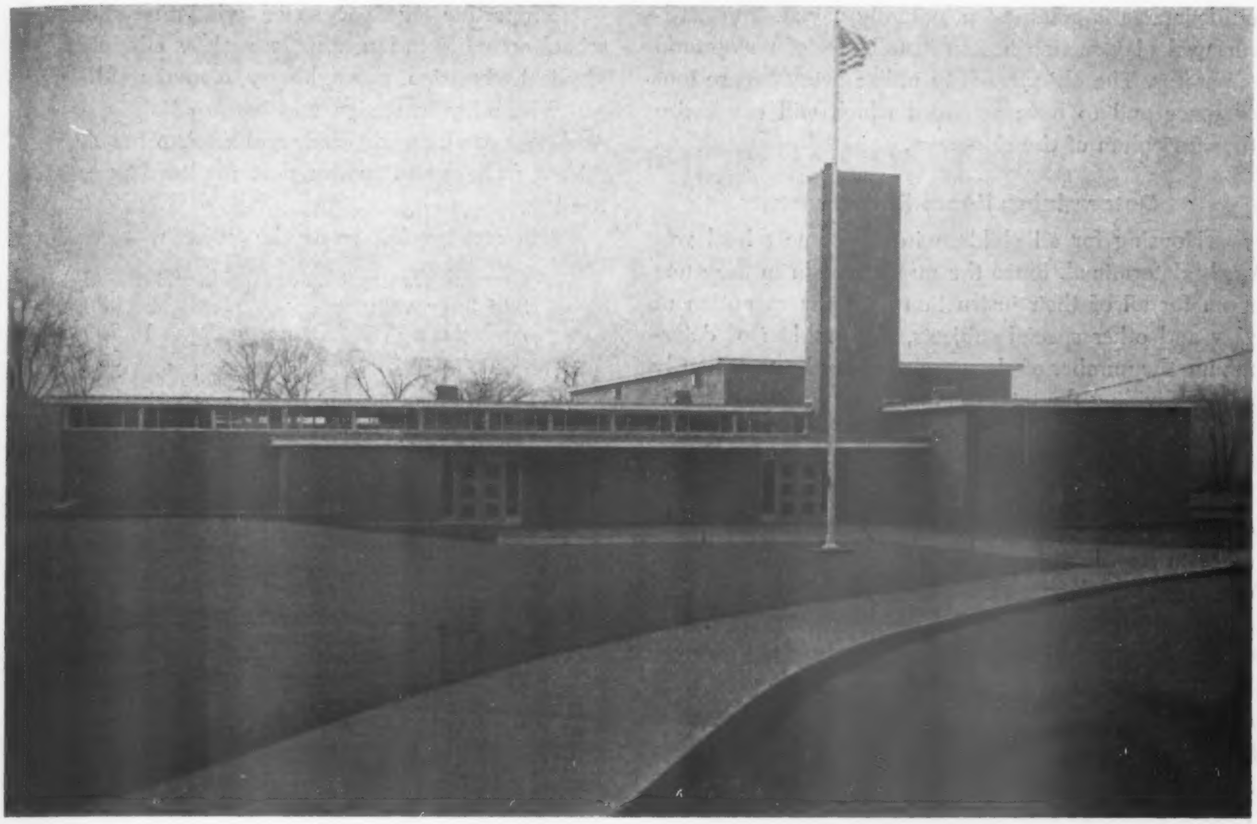


Each classroom accommodates 30 pupils, with the six primary rooms adjoining each other in a continuous row. A larger enrollment could be housed if necessary.

The all-purpose room is used for assembly, play and lunch purposes. Kitchen and food storage spaces adjoin.

The kindergarten, seen here from the exterior, is a major area of the school and has subordinate spaces—personal hygiene, storage and a cloakroom. Kindergarten children have a separate entrance to the school.





Fieldhouse facilities, with the boiler room at right, are connected to the athletic field and bleachers by a ramp. Area is in use after school hours and during the summer months.

High school athletes dress in the locker room of the fieldhouse. During summer months an organized group of amateur baseball players avail themselves of these facilities.

south exposure. There is good natural and artificial lighting. The storage space, which adjoins and which is directly accessible, is sufficient to carry at least one year's supplies. Kindergarten children have their own separate entrance to the school.

The Edgerton School is planned so that every child may have outdoor space in which to play and work without disturbance from the older groups who usually preempt play areas. The building facilities and outdoor areas are considered as one comprehensive educational plant. No sharp line is drawn between educational and play activities. Play or recreation is carried on within the classrooms as well as on the designated play areas.

Gardens for the Children

The landscaped section has been designed to give each primary grade one complete garden with an area 14 by 28 feet in size. The gardens will have plants, perennial and seasonal, and each child in the building will have responsibility for a particular plant or flower. Nature study will be encouraged through this care of a living and growing organism. Six gardens, one for each grade, were donated to the children of the school by the firm of Knight and Bostwick, Newark, New York.

Six outdoor classrooms, in addition to the gardens, consist of a space about 1,000 square feet each. Each

outdoor area is grassed and partially paved. The hard-surfaced play section has an installation of playground apparatus. The objective is to utilize every square foot of space and to have activities which will emphasize the curriculum of the classroom.

Determining Room Requirements

Housing for all children in the home school was easily determined. Since the pupils remain in the same room for all of their instruction with the exception of play and other special subjects, the problem of determining the number of classrooms required was primarily one of dividing the total number of pupils by the number to be accommodated in each classroom. In this calculation the only element of change is class size.

Each classroom in the Edgerton School accommodates 30 pupils. The six primary classrooms adjoin each other in one continuous row. There is ample space in each room for larger enrollment, if necessary. Natural and artificial lighting is effectively planned, the furniture is movable, each room is attractively pastel painted. Exposed steel beams in the ceiling add, rather than detract, to the beauty of each room.

The following benefits result when a home school is erected: the size of the site is minimized; and the ratio of necessary floor space per pupil is reduced.

Proportion of floor space ordinarily allotted to school activities in larger units, such as administration, physical education, shops, library, is minimized.

Flexibility in design and construction is possible. Additions can be made easily and economically. A natural atmosphere and environment for learning seems to result.

The cost breakdown for the project was as follows:

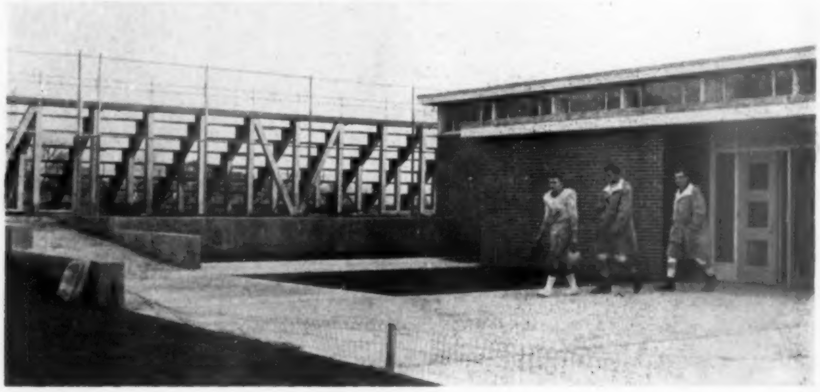
General Contract	$316,086
Site Improvement	18,906
Architect's Fees	19,800
Equipment (to date)	16,000

The total floor area is 19,340 square feet. The area of the fieldhouse is 3,500 square feet.

The home school was dedicated on December 15, 1957, and was named the Frederick W. Edgerton School in honor of a present member of the New London Board of Education who has served for 43 years.

Names Behind the Building

The general contractor was the firm of Alexander Schnip and Sons of Norwich, Connecticut. The architect was Fred Langdon of New London in association with the Malmfeldt Associates of Hartford. Engelhardt, Engelhardt, Leggett and Cornell of New York City were the educational consultants.



A short walk takes football players from the locker rooms up the ramp to the athletic field entrance.

JUNIOR-SENIOR HIGH SCHOOL WITH EMPHASIS ON QUALITY

by STANTON LEGGETT

Partner, Engelhardt, Engelhardt, Leggett and Cornell, Educational Consultants, New York City

Dr. Leggett was a Henry Evans Scholar at Columbia College where he received his A.B. degree, and held the Eleanor C. Morris Fellowship at Teachers College, Columbia University, for his M.A. degree. He also received his Ph.D. degree from Columbia University. Dr. Leggett held teaching and administrative posts in New York and New Jersey and also taught at Syracuse University and the University of Illinois. His work as educational consultant has brought him into close touch with school systems throughout the nation.

"HIGH quality" is the educational theme of the North Shore Schools,* and the new high school under construction in the district is designed to provide a stimulating environment for a superior educational program. The search for quality in education is apparent in the existing elementary schools, in the determination that resulted in the merger of three school districts into the present one, and in the community and staff thinking that led ultimately and not without battles to the financing, planning and construction of the new junior-senior high school.

The secondary school, located on a 30 acre site across the street from the recently constructed Kissam Lane School, will accommodate 1,200 pupils at optimum capacity in grades 7 to 12. It is expected that the building eventually will become a junior high school, with the senior high school being located on a separate site.

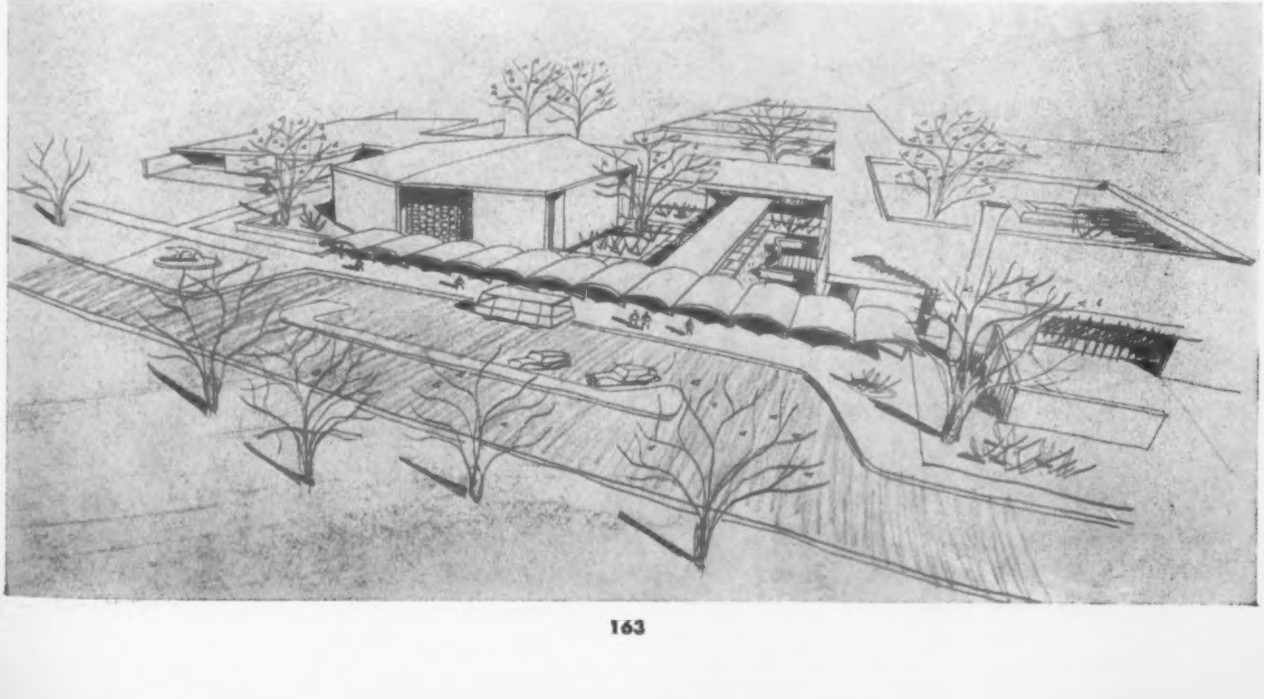
Among the major points of interest regarding the building as an educational tool are:

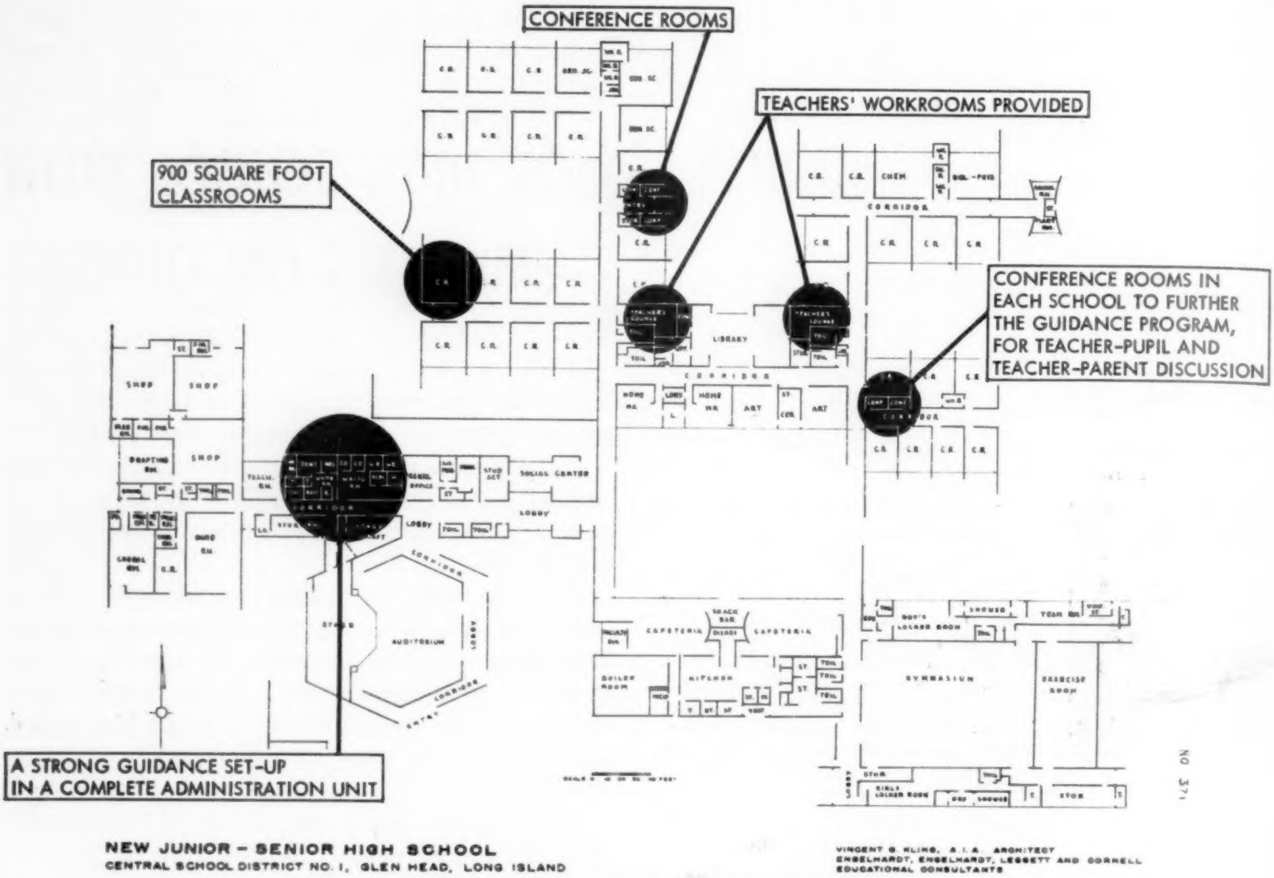
1. An attempt to provide personal scale within a large institution.
2. A solicitude for the provision of student spaces for use in an informal fashion.
3. Careful design for an active adult education program, youth program and unusually extensive use of school facilities by the community.

* Central School District Number 1 of the Towns of Oyster Bay and North Hempstead, New York, which includes Glen Head, Sea Cliff and Glenwood Landing.

Lawrence S. Williams

The Glen Head, Long Island, Junior-Senior High School will accommodate 1,200 pupils at optimum capacity. In reality it is two separate schools, senior and junior high.



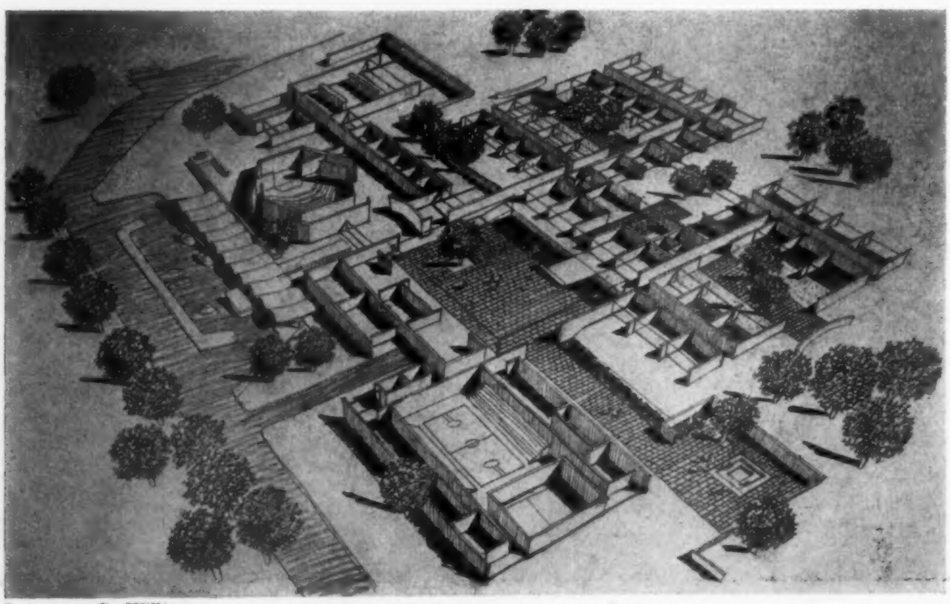


THE 1200 PUPIL SCHOOL IS REALLY TWO SCHOOLS
SUPPORTED BY SPECIALIZED SPACES USED IN COMMON

4. Because of the small 30 acre site, the building was made compact and the land-use pattern is intensive.
5. Whenever possible, outdoor areas are related to indoor uses.
6. Every attempt was made to provide a stimulating educational environment for students and staff.

Personal Scale of the School

The building for 1,200 pupils is in reality two separate schools of almost the same size, contained within the same organization of space. One of these is a junior high school for about 650 pupils, and the other is a senior high school for 550. Within each of the schools are the classrooms, science facilities, and guidance areas



Lawrence S. Williams

Architect of the school is Vincent G. Kling, AIA, of Philadelphia. The 30-acre site required that the building be made compact and that the land-use pattern be extensive.

(labeled conference rooms) that constitute the major educational spaces for students. Closely related is a common library that features flexibility in use and a shaded, outdoor reading terrace.

The remainder of the building contains specialized facilities—gymnasium, shops, auditorium and the like—that are shared by the two schools. The cafeteria, however, has been arranged in two sections so that junior and senior high students will be seated in separate rooms.

In the future, as the school district grows, it is anticipated that the new building will become a junior high school. At such a time, to avoid any institutional monumentalism, the building will be organized as two separate junior high schools. The use of a simplified form of the "school within a school" approach allows the development of a plant that is scaled to the needs of the students who will live and learn in the building.

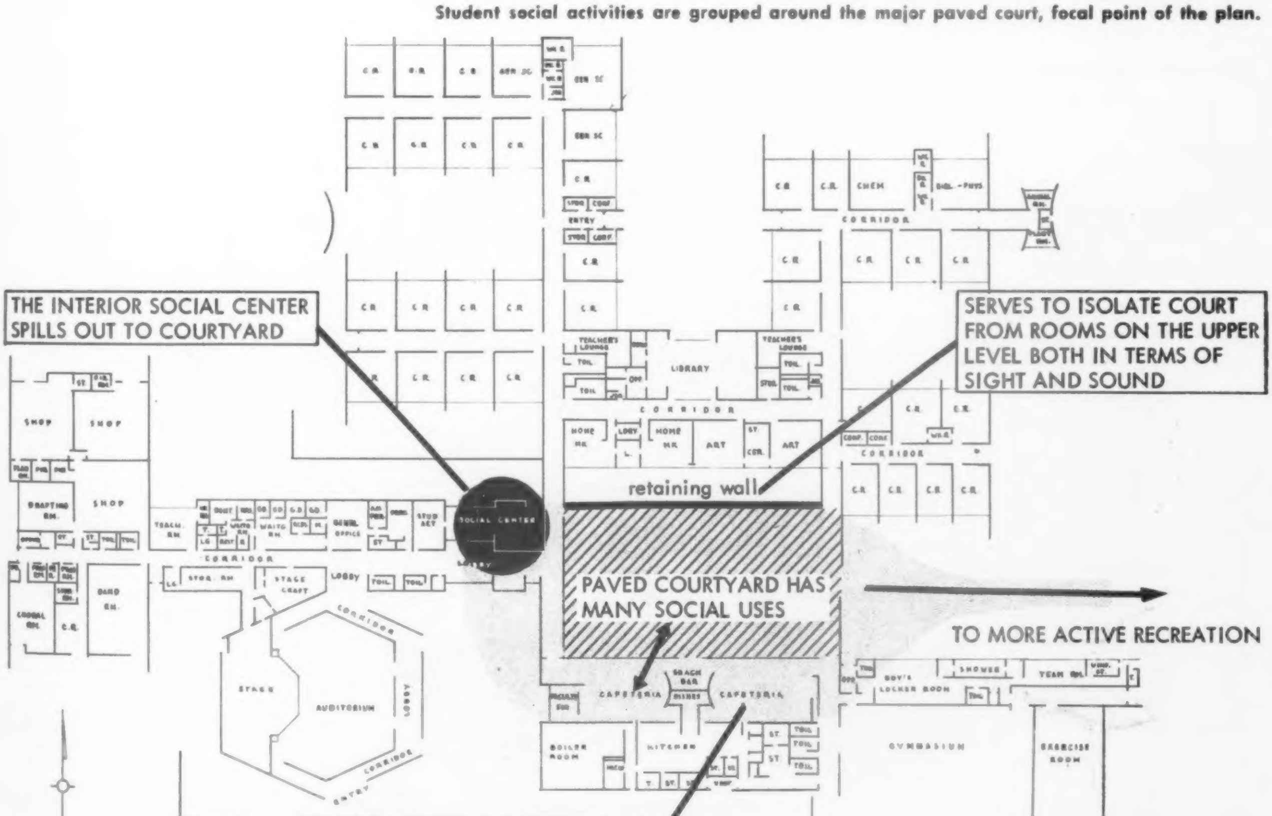
Student Social Spaces

The social nature of the secondary school student is of considerable importance. Recognizing this, the school has been planned so that some of its spaces may serve as teen-age centers. The lobby area of both auditorium and gymnasium has been reduced, and the use of the student center and cafeteria for social activities has been emphasized. As a result, the auditorium intermission space is in the student social center. Gymnasium crowds will use one of the cafeterias and the snack bar. On warm evenings the court will serve as a pleasant milling place.

Student social activity spaces are grouped around the major paved court which is, in many respects, the focal point of the whole plan. This spacious courtyard is isolated, soundwise, from the remainder of the building. It is at a lower level than the classrooms which lie to the north. The sight and sound separation is implied in the retaining wall which divides the areas. The student center is near at hand and, on good days, many activities of the center may be expected to move out here.

The cafeteria fronts on the outdoor court and the out-of-doors should, for a good part of the year, be a favorite after lunch lounging space for the student body. Dances will be held in the cafeteria, which has been designed as an attractive series of rooms. Weather permitting, the paved courtyard will serve as an extension of the dance floor.

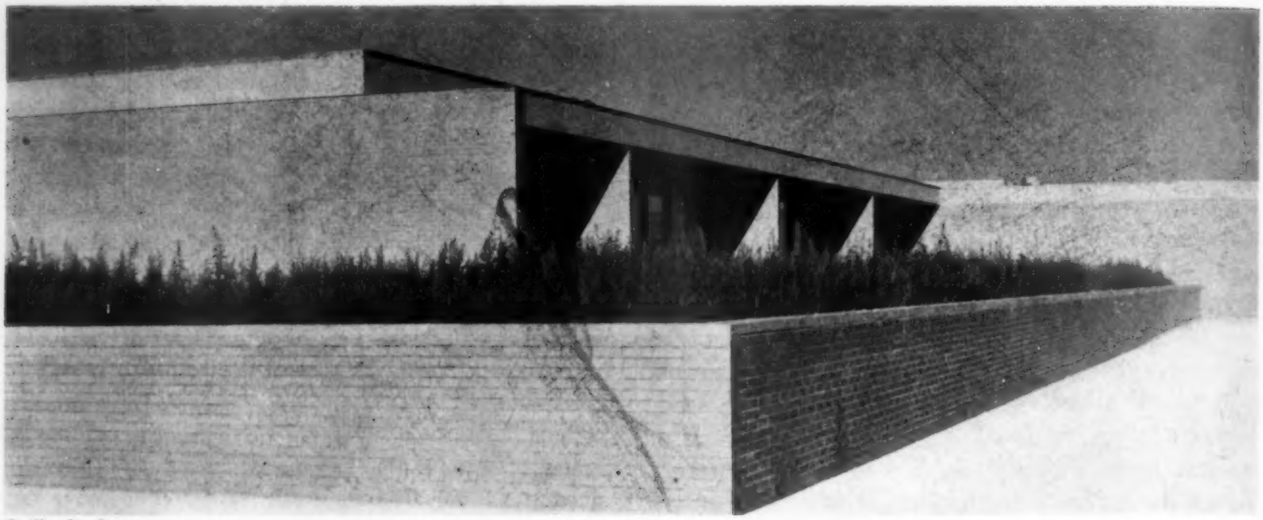
Student social activities are grouped around the major paved court, focal point of the plan.



NEW JUNIOR – SENIOR HIGH SCHOOL
CENTRAL SCHOOL DISTRICT NO. 1, GLEN HEAD, LONG ISLAND

VINCENT G. KLING, A.I.A. ARCHITECT
ENGELHARDT, ENGELHARDT, LEGGETT AND CORNELL
EDUCATIONAL CONSULTANTS

THE COURT IS THE CENTER OF THE SCHOOL'S INFORMAL ACTIVITIES



Guillo Studios

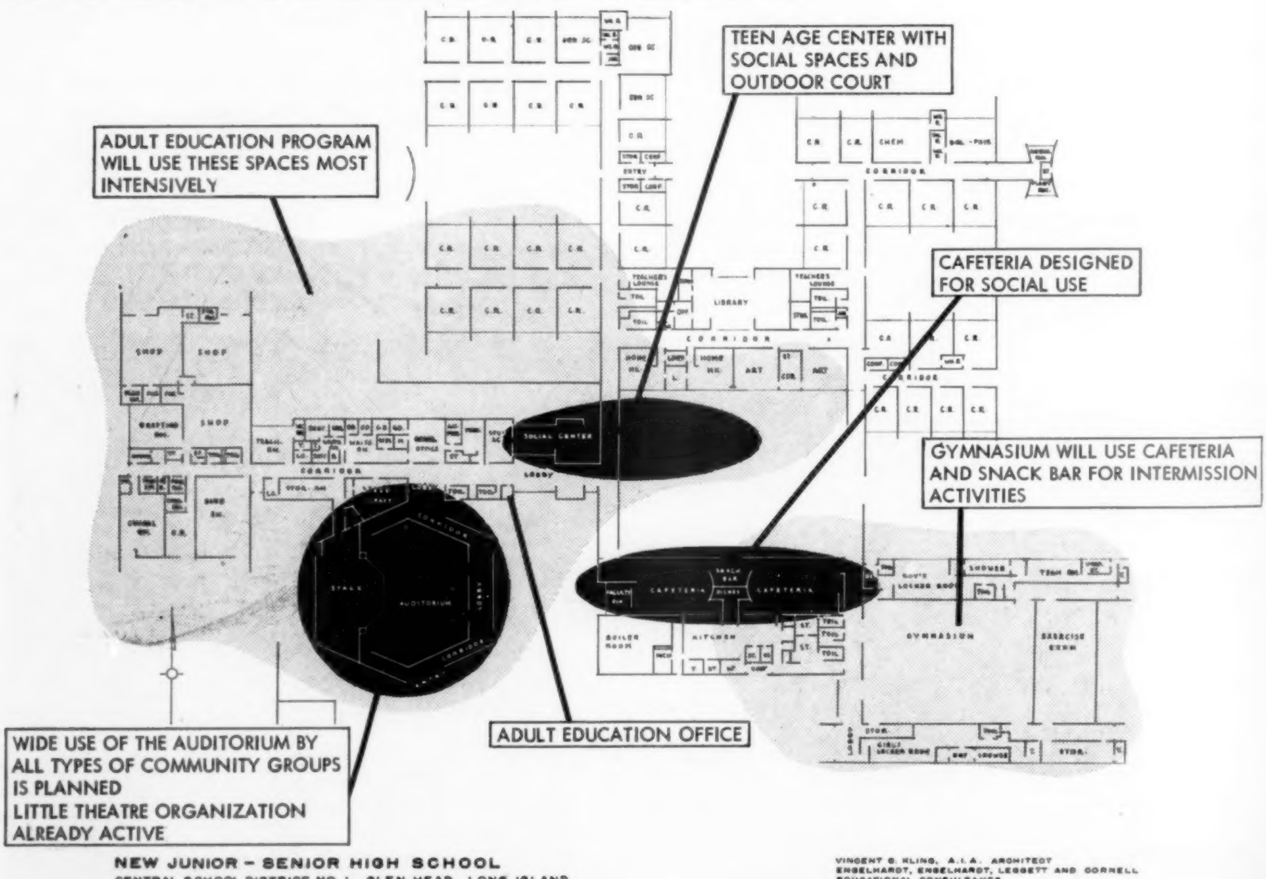
Junior wing of the Glen Head School is planned for 650 pupils.

From the courtyard wide walks lead to the outdoor recreational areas of the school. After school and during vacation periods, it is anticipated that the social areas will serve as a teen-age center, sharing in the interest generated by informal use of the gymnasium and athletic fields. That these spaces, used wisely and well, will provide a wholesome and stimulating area for student leisure time activities seems self-evident.

Community Use of the Plant

Present facilities of the North Shore School system are now taxed by a vigorous adult education program. In addition, the schools house a myriad of other community functions. With this background, the provision of excellent facilities at the new school suggests that the demand for even more community use of facilities may be expected.

Specialized facilities which will be used most by the public are near the main entrance.



WIDE COMMUNITY USE OF THE SCHOOL BUILDING IS FEATURED

The junior-senior high school building was planned so that the specialized facilities, with their greater incidence of adult and community use, would be nearest the public entrance. Although most of the classrooms are located away from the public entrance, one bank of eight rooms is situated near the major entrance and will be used by adult classes. The shops, homemaking and art rooms are near at hand. The auditorium, designed for use as a little theater as well as serving both school and community, is centrally located for group access.

The adult education and recreation program is serviced by a small office near the main entrance of the building.

Land Use Pattern

The small 30 acre site for the 1,200-pupil school, which must accommodate a maximum of 1,500 students before relief can be given, required the development of an intensive land use pattern. Of major concern was providing off-street parking both for faculty and student cars during the day, and for parking needs occasioned by community use of facilities at night. More than 350 cars can be parked on the site. A portion of the play fields has been hard surfaced for court games and for use when the grounds are too damp for athletics. This paved play area will double as parking space when large crowds must be accommodated.

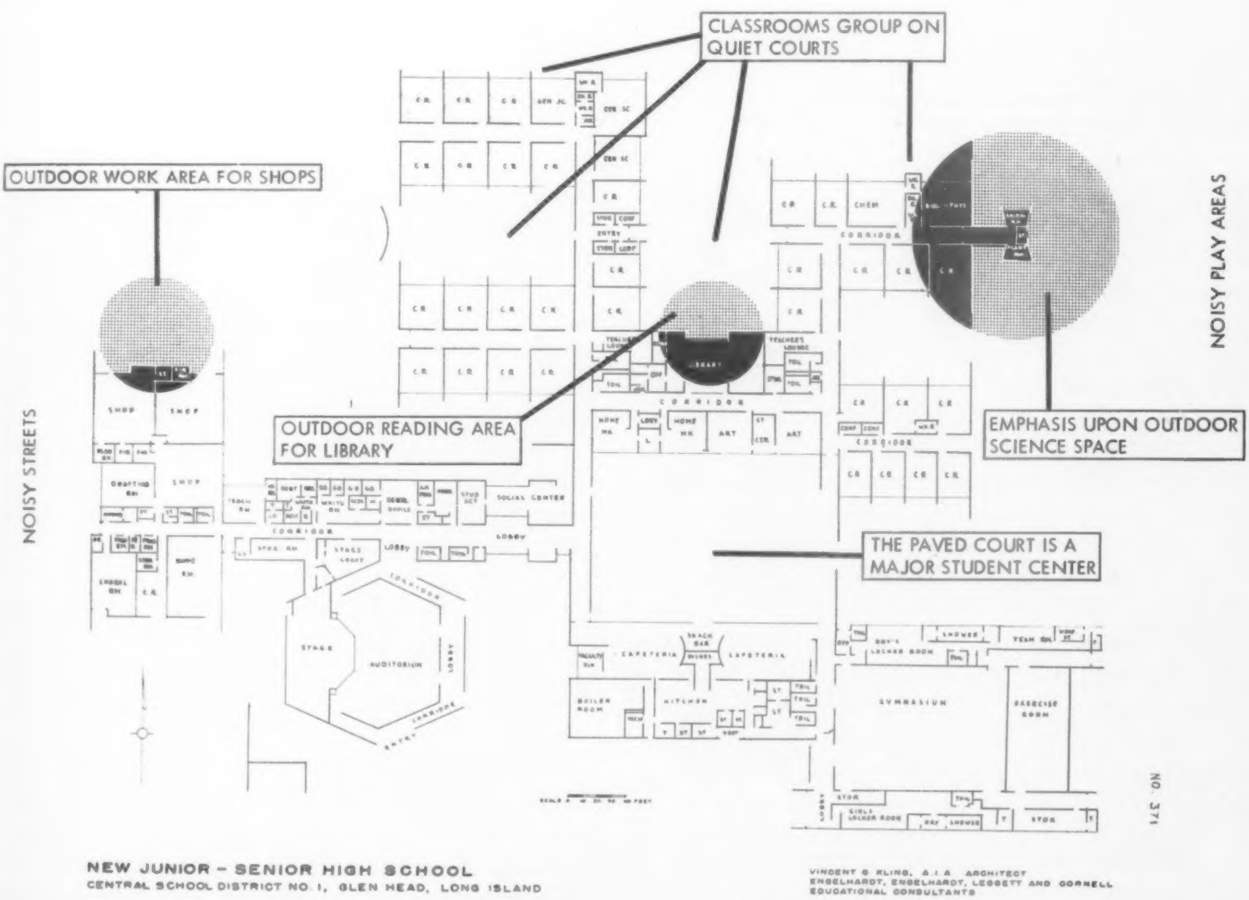
The building, although one story in height, is compact. Extensive studies made at an early stage of design show that multi-story construction would not appreciably change the ground coverage of the building.

To the rear of the site, extensive earth movement was necessary to create play fields which would utilize as much of the site as possible. In view of the strong intramural athletic and recreational program to be operated parallel to the physical education and varsity athletic schedule, heavy service is required of all indoor and outdoor sports facilities.

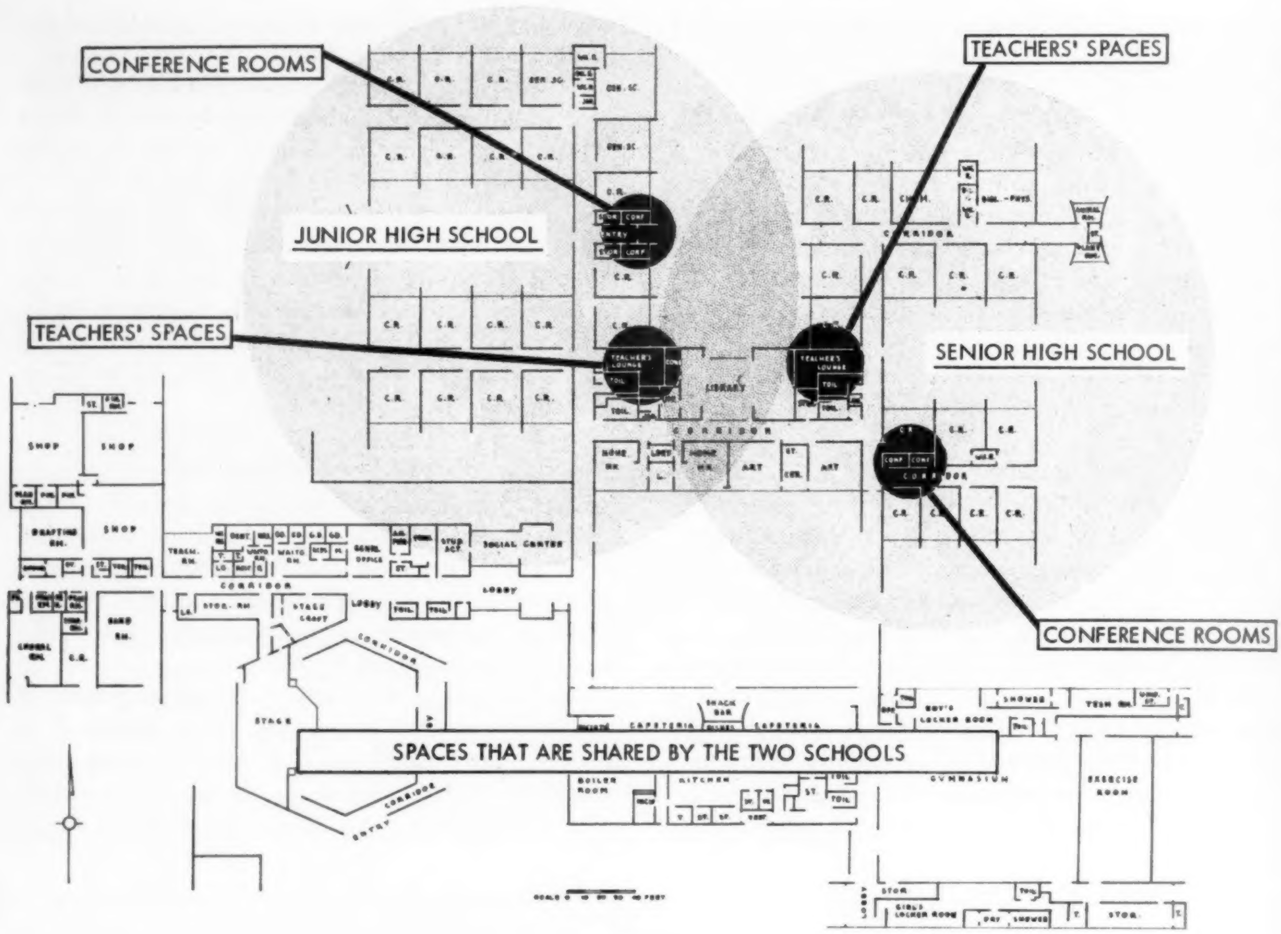
Use of the Out-of-Doors

Throughout the school the use of the out-of-doors has been stressed in planning the building. Mentioned earlier was the emphasis upon the courtyard as a center for student activities. Activities of the athletic, physical education and recreation program obviously will take up a large percentage of the site.

Other units of the school reveal the importance of site utilization. The library has, as a portion of its space, a covered paved area in a secluded section of the site. Here outdoor reading on pleasant days will be possible, as well as comfortable. The art rooms are lo-



MANY USES OF THE OUT-OF-DOORS ARE PROVIDED



NEW JUNIOR - SENIOR HIGH SCHOOL
CENTRAL SCHOOL DISTRICT NO. 1, GLEN HEAD, LONG ISLAND

VINCENT G. KLING, A.I.A. ARCHITECT
ENGELHARDT, ENGELHARDT, LEGGETT AND CORNELL
EDUCATIONAL CONSULTANTS

SOME FEATURES OF THE EMPHASIS UPON EDUCATIONAL QUALITY

cated near a corridor leading to the paved courtyard. It is anticipated that this section will serve outdoor sketch groups and the like. The shops have outside aprons for work on large projects.

Of considerable interest is the relationship of science to the out-of-doors, particularly at the senior high school level. A separate small building will house an animal and plant growing area. It will also provide storage for tools and supplies for experimental gardens and other science projects. It is hoped that a penetrating interest in the sciences will be developed by likely students with the help of the excellent facilities available to them.

The overall building design is introspective, in a sense. This implies that, rather than having students in classrooms look out at noisy streets and noisy playfield, all classrooms are grouped about quiet courts. The opportunity and funds have been provided for planting, and the courts are planned as areas of peace and beauty.

An Effective Educational Environment

Unless the requirements for an effective educational environment are met, all else is gilt for the lily. Basic to the approach for the new North Shore Junior-Senior High School has been the provision of classrooms planned for maximum utility. The classrooms are well equipped and larger than customary, having about 900 square feet of area. There are sinks in many of them, and all have a large amount of work space, storage facilities and an optimum amount of display area.

In each portion of the building, intensive study of equipment needs and teaching devices has influenced design. Music, art, shop and homemaking spaces of high caliber have been provided.

A relatively large allotment of space has been given to guidance functions, both in the central office area and in the junior and senior high schools. Teachers' workrooms are provided in strategic sections of the plant.

Aesthetic Environment Is Important

The basic plan and form of the school expresses variety and informality within an ordered framework. Against the clean rectangular prisms of the other buildings the hexagonal auditorium stands out in pleasant contrast. This form is the direct outgrowth of a studied

This seventh grade classroom is part of the junior high school wing of the building. A common library serves both junior and senior sections.

Work counter lines one wall of the seventh grade classroom and is complete with a sink. Glass wall panel permits a view of the corridor from within the classroom. Tackboard to the ceiling is located above the work counter.

Guillo Studios

effort to provide the best possible acoustical environment for an audience of 1,200.

Colors and textures play an important part in establishing the character of various elements. The use of buff masonry exterior walls throughout, and of a continuous fascia of white porcelain enamel, tends to unify the building group and provide a neutral background for landscaping and for intensive activity. Use of masonry walls and structural tile inside classrooms and corridors bespeaks the "workshop" character of these spaces.

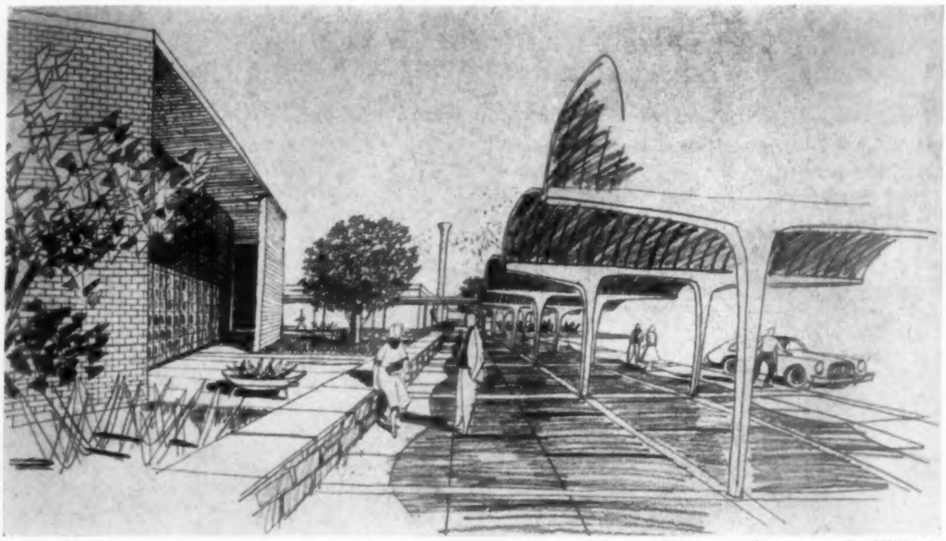
Use of Multi-Colors

Colors on classroom walls, where tackboard displays will be bright and eye-catching, are subdued tones, while cabinet doors below are accented in bright hues. Patterned multi-colored walls of Venetian mosaic highlight the two principal traffic centers—cafeteria and auditorium lobby. On the main entrance side, the outside auditorium wall is drawn back to reveal this mosaic and give the approaching visitor a hint of the vitality inside.

Sharing the Planning

Participating actively in planning the new junior-senior high school for the North Shore Schools were F. Remington Furlong, supervising principal; John E. French, principal; Vincent G. Kling, AIA, architect of Philadelphia; Engelhardt, Engelhardt, Leggett and Cornell, educational consultants of New York City; Severud, Elstad, Krueger, structural engineers of New York; Pennell and Wiltberger, mechanical engineers of Philadelphia; and Innocenti-Webel, landscape architects of Roslyn, Long Island.

Out of staff study, labor of the board of education and the administrative staff, and cooperative planning by the architect, educational consultants, landscape architects and mechanical and structural engineers has come a secondary school that achieves the goal of quality in educational environment.



Lawrence S. Williams

Bus loading platform has a canopied shelter for pupils as they enter or leave the buses. Covered passageway connects from here to the main areas of the building.

Joseph W. Molitor Photos

Circular cafeteria of the Westwood High School is flanked by the auditorium at left and one classroom wing at right. Coletti Bros. are the architects.

ECONOMICAL HIGH SCHOOL OF LASTING BEAUTY, WESTWOOD, MASS.

by ISAIAH CHASE

Principal, Westwood High School, Westwood, Massachusetts

Mr. Chase received his A.B. and M.A. degrees from Harvard University in 1930 and 1933. He also holds a "Diplome" from the University of Bordeaux, France, and the 30-hour certificate in Education from Boston University. He has been principal of Westwood High School since 1949.

WESTWOOD lies 15 miles southwest of Boston, Massachusetts. Before World War II the town had just begun to change from an area of large estates and farms to a typical suburban community. In 1940 a new six-year high school was opened to accommodate 300 pupils. The town had previously tuitioned its high school pupils to neighboring towns.

After the war, however, population zoomed phenomenally making Westwood, for a while, the most rapidly growing town in the state. A new elementary school, opened in 1948, failed to stem the tide of expanding educational demands.

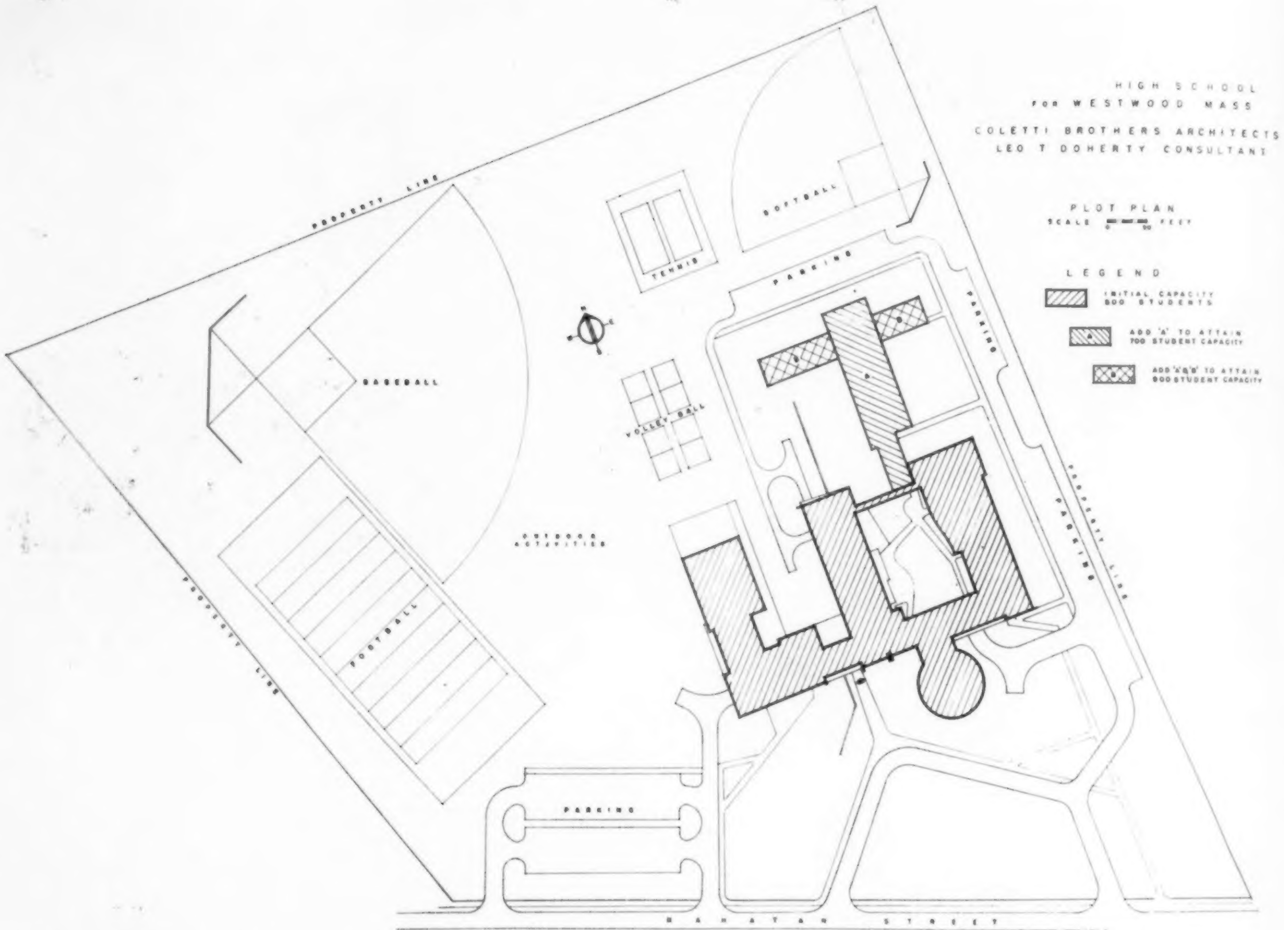
A school survey committee was named by the town moderator in March, 1949, and was given the task of preparing a detailed study of school requirements with proposed solutions to meet those requirements. A second new elementary school received immediate priority and then the high school problem was tackled seriously.

From the beginning, the superintendent and the high school principal were requested to attend all meetings of the survey committee and later of the building committee. Their work in the eventual selection of equipment was of great importance.

The Site Is Purchased

In March, 1950, a site was chosen and 21 acres of land were purchased. Three additional acres were added to the site in 1954. In November, 1951, the architectural firm of Coletti Brothers of Boston was employed to draw preliminary plans.

The architects, the survey committee and the high school faculty held several joint meetings to compile educational specifications; and the services of an educational consultant, Mr. Leo Doherty of Worcester, were engaged on a per diem basis. It was the evident



Initial capacity of the school is 500 students. However, plot plan indicates how additions A and B can be constructed to increase capacity to 900.

desire of the majority of Westwood citizens that their educational facilities should meet the needs of youth as thoroughly as the demands of economy would permit.

To this end the architect was instructed to make proper choices in materials and size of areas. Members of the high school staff assisted by constructing models of specific areas, such as the art room, industrial arts, home economics and science laboratories. These were

Sloping design of the high school art room is seen from the rear of the school. Glass enclosed corridors connect the units of the school.

incorporated into the overall design by the architect.

Further Planning Complications

The school survey committee then found its work further complicated by the immediate necessity of building a third elementary school in a section of town which was undergoing extraordinary growth. The pressures of rapid expansion made economy of construction all the more essential.

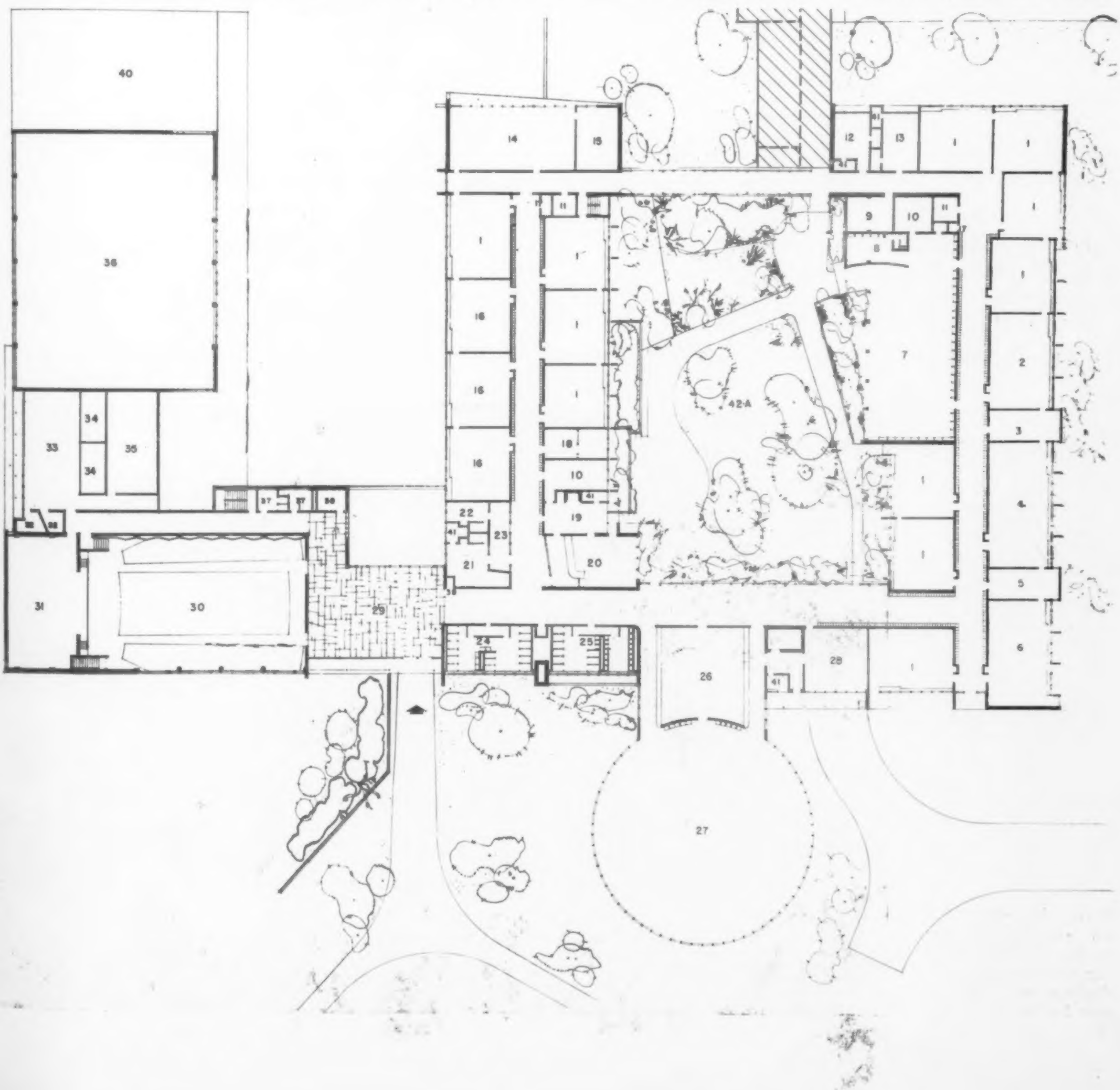
Prior to the town meeting of March, 1953, pictorial brochures outlining the high school needs of the town and showing the design and estimated cost of the proposed building were circulated to all voters. At the ensuing meeting the voters decided to proceed with the elementary school, but requested delay and further study on the subject of the high school.

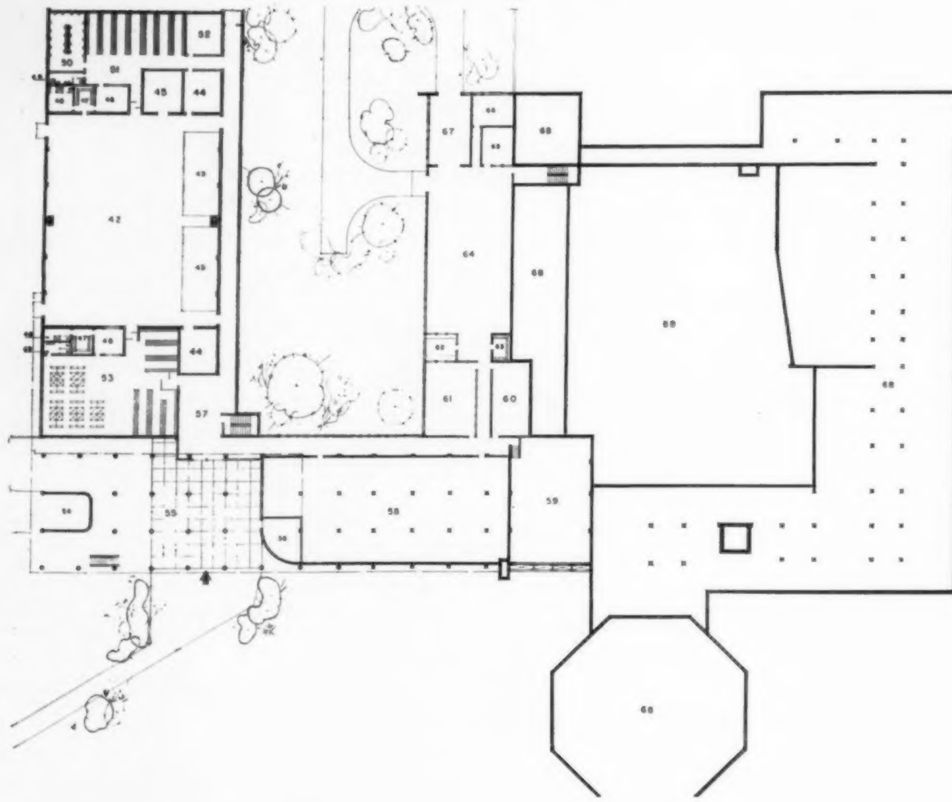
As a result of that meeting the moderator appointed a high school building committee. Mr. Thornton S. Munson, a construction specialist of wide experience, became chairman of that committee. Mainly as a result of his persistent efforts the building, as originally sketched by the architects, the survey committee and the high school faculty, eventually became a reality.

Long-Range Planning

A study of the school population figures showed that in 1963 the probable needs of a four-year high school could be met by a building accommodating 900

First floor of the Westwood High School includes the following areas: 1. general classrooms, 2. biology-science, 3. science storage, 4. chemistry-physics, 5. homemaking storage, 6. homemaking, 7. library, 8. library workroom, 9. teachers' workroom, 10. conference room, 11. supply storage, 12. men teachers' room, 13. women teachers' room, 14. art, 15. art storage and supply, 16. business education, 17. janitor's storage, 18. guidance, 19. principal, 20. general administration, 21. medical health, 22. dental, 23. health waiting room, 24. girls' toilet, 25. boys' toilet, 26. kitchen, 27. cafeteria, 28. kitchen supplies and storage, 29. lobby, 30. auditorium, 31. stage, 32. practice rooms, 33. band and music, 34. instrument storage, 35. fan room, 36. upper gymnasium, 37. public toilets, 38. coat room, 39. public telephone, 40. roof over locker and shower rooms, 41. toilet rooms, and 42-A. court.





Areas of the ground floor are:
42. Gymnasium
43. Folding bleachers
44. Corrective
45. Apparatus
46. Gym instructor
47. Supplies
48. Dressing room, toilet, showers
49. Toilet
50. Gang showers
51. Boys' locker room
52. Drying room
53. Girls' locker and showers
54. Garage
55. Shelter
56. Tools
57. Lobby
58. Storage
59. Boiler room
60. Lecture room
61. Drafting
62. Office
63. Dark room
64. Shops
65. Storage
66. Finishing room
67. Power mechanics

pupils. Furthermore, it appeared that the enrollment figures might level off at around that number for an indefinite period. If further unforeseen growth developed, the problem could be solved by changing from a 6–2–4 system to a 6–3–3, with the possibility of erecting a second junior high school building.

The needs of grades seven and eight could be met in the building erected in 1941, with an addition probably necessary by 1958. The Massachusetts School Building Assistance Commission, in particular Mr. John Marshall, its director at the time, gave much assistance in thinking through the long-range problem, as well as in the solution of many immediate tasks.

The Funds Are Voted

At a special town meeting in February, 1954, West-

Library has an acoustical ceiling. As more books are added, shelving space now used for displays will hold the new books.

wood voted the sum of $1,203,500. Citizens gave the high school building committee a mandate to proceed with the preliminary plans laid down by the survey committee. Instructions were given to obtain bids on alternates to the building to keep the cost within the sum voted.

Basic Facilities for 900

The building committee, the survey committee, and the town finance committee had agreed that the basic facilities (heating, cafeteria, shop, gym) for the eventual 900 capacity should be built into the original construction. If necessary, for financial reasons, one half of the gymnasium, a connecting corridor, an art room and layout of the grounds could be postponed.

Bids Are Opened

The building committee proceeded with working drawings, specifications and the suggested alternates. They received and opened bids and found that, with an additional $400,000, they could build and equip a high school for 500 capacity. Original plans had called for a school of this size. This was true in spite of the rapid rise in costs which had taken place during the

Arts and crafts activities are carried out in the spacious art room with its sloping window wall. Work counters, sinks, and various sized tables are provided, together with storage cabinets and drawers for all kinds of supplies and equipment.

Seating capacity of the auditorium is 550. Unusual feature are the windows along one side which can be darkened with draw draperies.

Six unit kitchens make up the kitchen area of the homemaking laboratories. Both gas and electric stoves are included in the equipment.

year's delay. Accordingly, a special town meeting was called in January, 1955, and the extra $400,000 was voted unanimously.

Voice of the People

The unanimous vote was significant. In 1953 the town had been faced with a school construction problem which, for the size and resources of the town, was stupendous. The people were anxious to reach the most economical solution possible which would yet be consistent with good education and the philosophy of providing general education for all pupils, and a varied program to fit individual needs and differences.

A town by-law requires a majority of two-thirds for a bonded appropriation such as was needed to build the school. In 1953 the two-thirds majority was lacking; in 1954 more than the two-thirds had become convinced that the plan of the survey committee was proper; and in 1955 the voters were convinced of both the need and the outlined solution.

High School of Beauty and Function

The building as it now stands shows the results of long and careful planning. There are no features which can be classified as luxury items. Whatever aesthetic beauty it may have lies in its color schemes and the harmony of lines in its construction. Its design fits into the topography of the site, oriented to natural light so that the function of its special areas is best served by the exposure.

Although the general design of the buildings cannot be termed a campus type, it shows the influence of that innovation in the Northeast. The high school has an enclosed quadrangle formed by two wings, the main

Typical classroom has one piece desk and chair combinations for students. Connecting corridor and courtyard may be seen in the background.

Auditorium lobby leads to the main corridor of the building.

Main switchboard for the school is located in the general administration office. Windows overlook the enclosed quadrangle.

corridor and a connecting corridor. The gymnasium and locker rooms form a third wing, while the auditorium continues the line of the main corridor giving the floor plan a resemblance to the capital letter E. The noisy areas are remote from the library and academic class rooms.

Availability for community and recreational use of the building and grounds has been arranged. Future expansion of library, laboratory, lavatory and classroom space has also been planned.

The Circular Cafeteria

A prominent feature of the building is the circular cafeteria located at the front. This gives an appearance of luxury and some graciousness while its cost is actually below what could be expected for any area of similar size. It has exterior doors and the requirements of community usage may be met without interference with other areas of the school.

Students enter the cafeteria along two serving lines at either side of the modern kitchen. The cafeteria is equipped with 100 four-place tables, pedestal type. The unit is used during the non-lunch hours as a study hall where each student has an individual table at which to prepare his lessons.

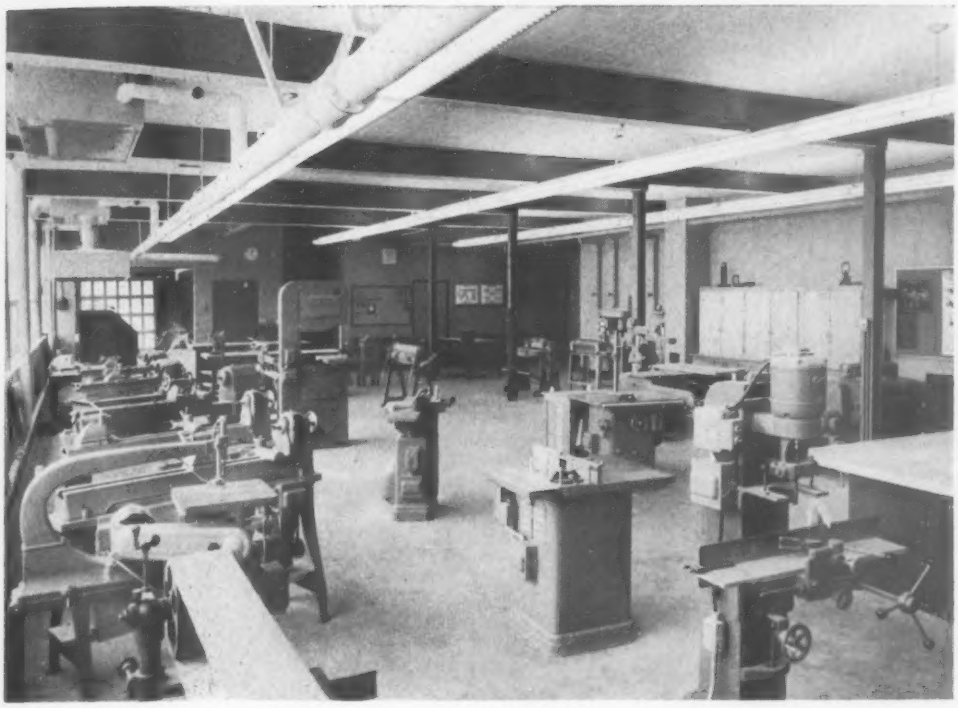
550-Capacity Auditorium

The size of the auditorium required considerable thought in the planning stage. The ultimate decision was for a seating capacity of 550. Consideration was given to other halls in the town and to the fact that the gymnasium could be used on the few occasions when a larger assembly room would be required.

The building is basically on one floor, although two

Small, 4-place tables tend to make the lunch period quiet and orderly. As a study hall, the area is sufficient for one student to have the whole table for use as a desk.

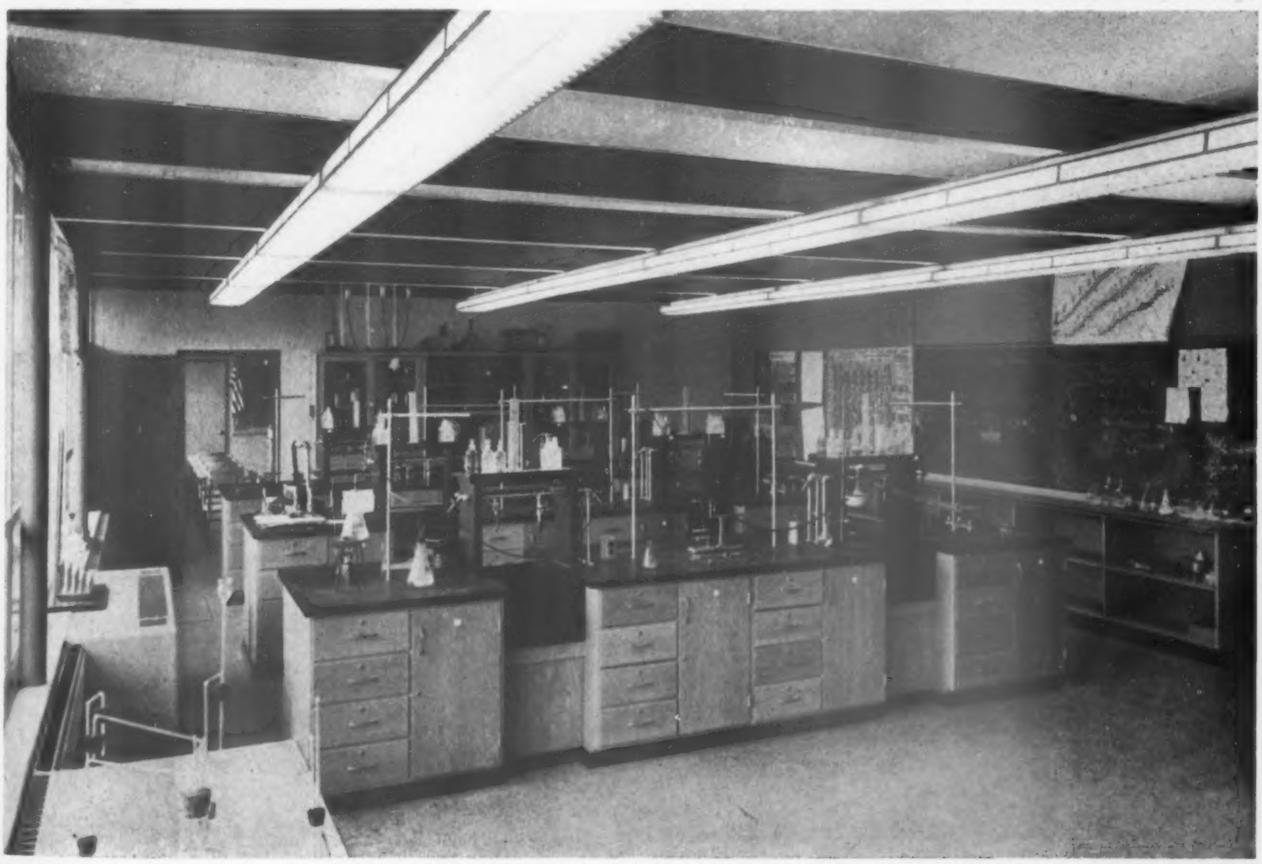
Clear glass panels permit view of the main area of the library from the workroom, at the rear. Tables vary in shape and size.



Industrial arts section of the shops unit is complete with power tools commonly used in industry today.

floors of the central wing adapt to the natural slope of the ground. There are ten interchangeable classrooms, three science demonstration classrooms, three business education rooms, a biology laboratory, a chemistry-physics laboratory, a library, an art room with slanted windows on the north exposure, two homemaking laboratories, an industrial arts shop, a mechanical drawing room, a visual aids room, a guidance suite, health suite, a music suite (part of which doubles as a dressing room for the stage), storage rooms, teachers rooms and

Chemistry-physics laboratory equipment was carefully selected by a faculty committee. Room is complete for needs of the students.



From main corridor, library may be seen across the court. Below is a view of the mechanical drawing room, part of the industrial arts area. Table tops may be adjusted as required for drawing tasks.

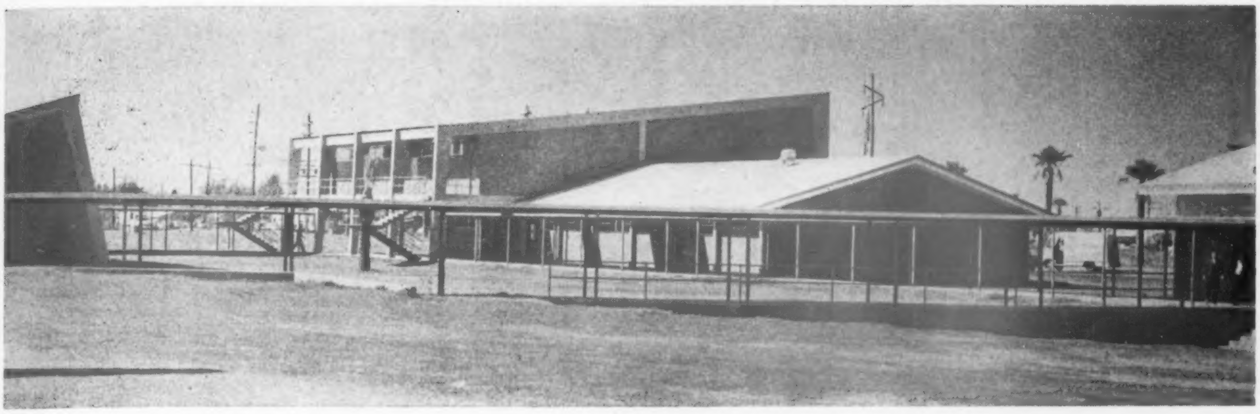
an administration suite. There is a large sheltered terrace under the auditorium.

The auditorium is heated by radiant heating in the floor as well as by warmed ventilation. The grounds are landscaped and contain a football field, a baseball diamond, a volley ball court, a softball diamond, four tennis courts and paved parking facilities for 250 cars.

Financing Arrangements

Total funds appropriated for the school, including amounts for land purchase, architect's fees, services, and equipment, were $1,705,100. Of that amount $1,650,000 was borrowed. The Commonwealth of Massachusetts, under the School Building Assistance Act, reimburses the town of Westwood for 46 percent of the cost of construction and equipping. The state's payments are distributed over a period of 20 years.

The cost of the building, erected during the recent period of high costs, was $13.25 per square foot. It is to be noted that while the capacity is 500 pupils, some of the most costly provisions for the 900 pupil school are already built. The architects were the Coletti Brothers of Boston and the general contractor was Wexler Construction Company of Newton.



The combination administration building and library are one unit of the new Carl Hayden High School, designed by Lescher and Mahoney of Phoenix, Ariz.

AIR-CONDITIONED HIGH SCHOOL AT PHOENIX, ARIZONA

by LES MAHONEY

AIA, Lescher and Mahoney, Architect-Engineer, Phoenix, Arizona

Mr. Mahoney has had a wide and varied background in architecture, including extensive travel in Europe to study buildings there. His work includes college buildings, banks, hospitals, airports, office buildings, churches, large residences and school work. He has kept abreast of the latest developments in the school field.

FOR a number of years the Phoenix Union High School District of Maricopa County, Arizona, (an 8–4 system) followed a normal growth pattern, consistent with our agricultural economy. Then, in the early years of World War II, Phoenix and its environs were discovered by the armed forces, especially the Air Force. The almost 100 percent perfect flying weather was a revelation to them. The ideal climatic conditions and the casual way of southwestern life created a desire both on the part of trainees and executives to come back here after the war and make their home.

Added to this, world unrest has caused many future possible war plants to move inland from coastal areas where they were "sitting ducks" for attack. According to statistics prepared by local institutions, the metropolitan area of Phoenix is experiencing an immigration of 1,000 families per month.

Our board of education and the executive staff of the Phoenix Union High School District are well aware of the problems caused by the increased population. With the dynamic population growth and consequent expansion of the feeder elementary districts, the board early realized that a secondary school construction program had to be initiated.

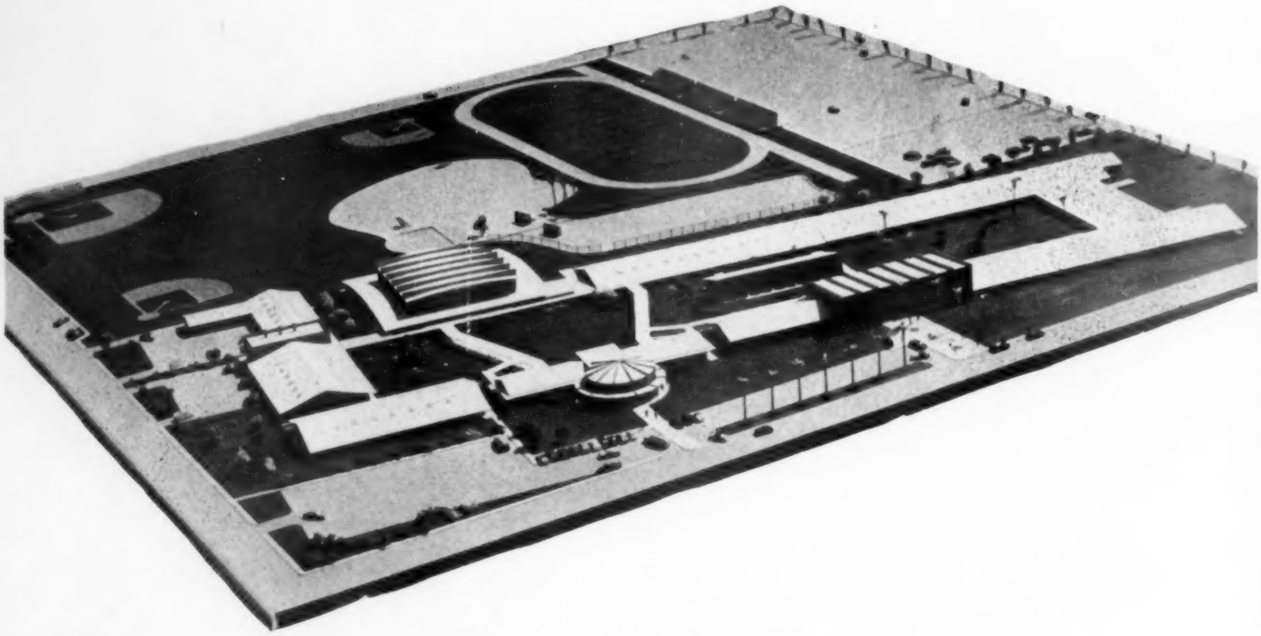
Long-Range Planning Program

In 1953 the board of education retained the services of the University of Southern California to conduct a school survey. This work was undertaken by a distinguished staff of 32 people, under the direction of Irving R. Melbo, dean of the School of Education at the university.

The completed survey, in two volumes and comprising over 700 pages, was presented to the board in July, 1954. The report indicated an ultimate need for fifteen secondary schools. These were to be located so they would serve the families of the district area and the feeder graduating elementary pupils. This survey, together with the assistance and cooperation of the school administrators and their staffs, has been one of the main guides for the architect in his design work.

The Planning Process

A school planning procedure, adopted by the Phoenix Union High School System some years ago, has been for the administrator to appoint advisory teacher groups from various departments to work with the architects. These groups consist of two to five persons and represent commerce, home economics, art, science, physical education, shops, library, visual



Model shows how the new high school in Phoenix will appear when all phases of construction are complete. Instead of an auditorium, a terraced, open air seating space will be used for assembly purposes.

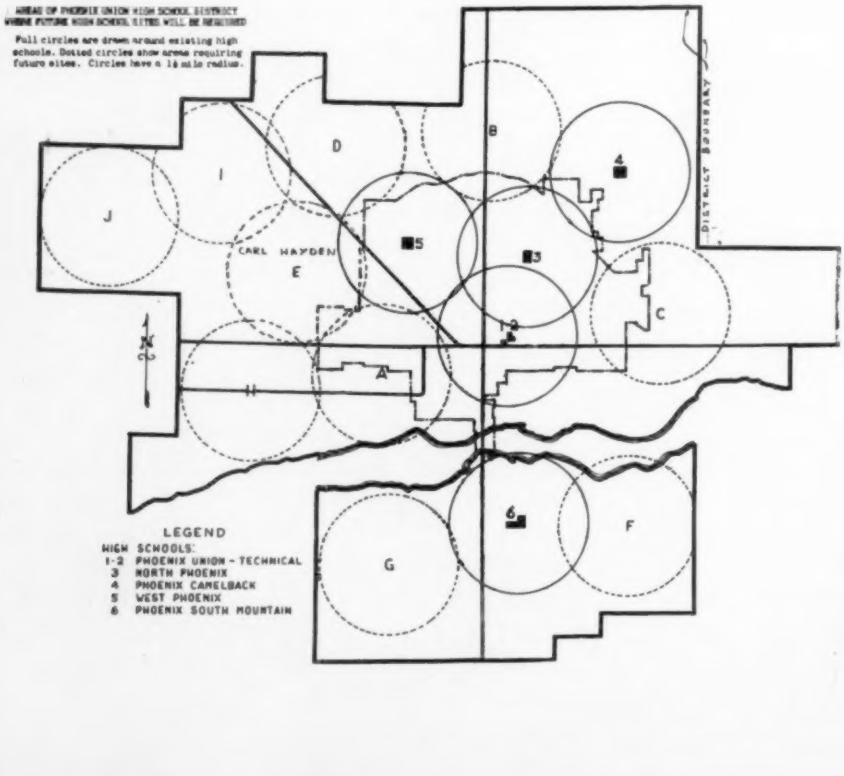
aid, etc. Each consulting group reviews and suggests needs in its own section.

The superintendent of buildings and grounds and several of his staff also attend the conferences. In particular they direct and review layouts, and make proposals regarding the type of structure, use of materials, and the mechanical requirements for the electrical, gas, heating and cooling systems. Theirs is the task of maintaining and keeping in operation the buildings and grounds after the architects and contractors have departed from the scene. Maintenance forms a large item in the school budgets of America, and initial thinking and cooperation between the architect and the department of buildings and grounds will help to reduce future costs.

It is our confirmed opinion that the better the structure and finishes, the lower the future maintenance costs. In this regard, we do not mean the use of expensive or so called "fancy" materials.

The First New Plant

The staff of the architects, Lescher and Mahoney of Phoenix, prepared an overall preliminary plan for a new secondary school, using a basic area of 85–100



Phoenix is a city which has expanded rapidly since World War II. The Carl Hayden High School is only one of many new high schools needed. Full circles surround existing high schools, dotted line circles indicate future sites of needed high schools.

square feet per student, subject to such modification as the conference groups would direct. This secondary school plant is the first development under the new program. It provides a complete, fully integrated secondary school on an 8–4 system for an ultimate enrollment of 2,500 students.

Some criticism by the University of Southern California survey team was directed at planning so large a school. However, inasmuch as the school system had been established for many years on this basis, it was decided to continue with the plan.

It has long been the policy of the board of education to use not less than 40 acres of ground for a complete school development. Numerous studies on paper and with block models were developed of several building arrangements, including the finger plan, both one and two story. The layout which best suited the educational needs and site potential was the grouping of various buildings around open courts.

No auditorium has been provided. Instead, there is a large, open air, terraced seating space, facing a stage. Here again, the ideal climate supports such an arrangement. It was the expressed opinion of the U.S.C. survey staff that the present school system provides enough auditoriums. Since they are an expensive type of building, additional auditoriums were deemed unnecessary. Special seating arrangements are possible in the gymnasium, where chair trucks and a movable stage have been constructed.

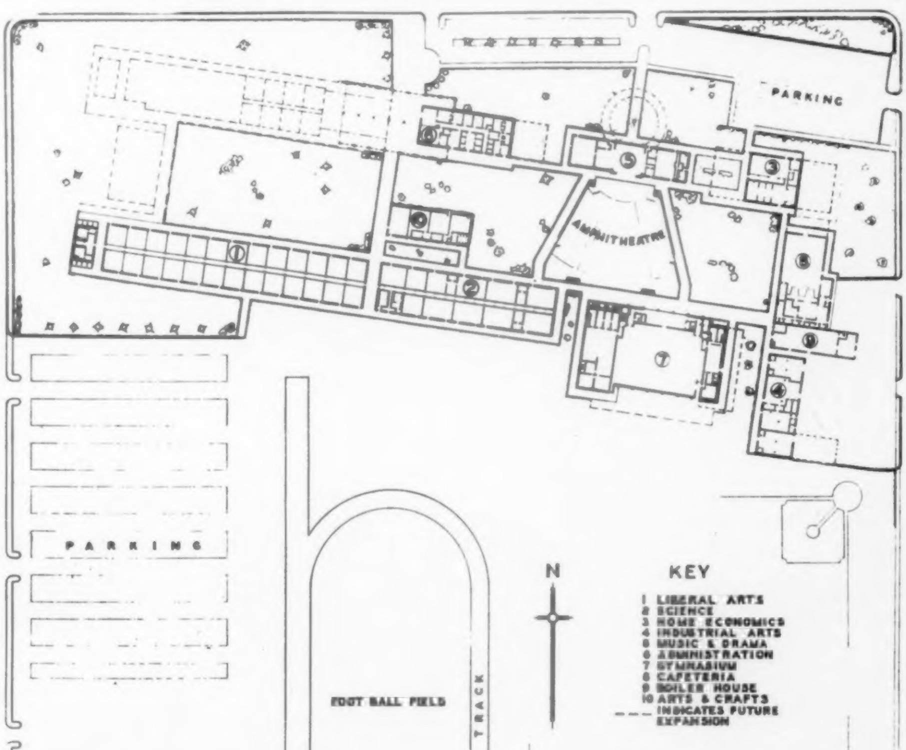
Open Air Courts

Different elements of the building plan are grouped to create a series of open air courts traversed by covered arcades. Each court is descriptive of the adjoining building function. Near the cafeteria will be the open air dining court, where outdoor dining tables will be placed. Other outdoor areas are the amphitheater, seating 3,000 persons, the court of arts and the academic court. With landscaping, these areas form ideal social meeting spaces. The grouping of the buildings forms a buffer against the streets, giving privacy to the inner courts.

The architecture, as finally crystallized, is a low ranging series of buildings, mostly one story, whose exterior is an expression of the western ranch motif, executed in a modern manner.

Consultation with U.S. Weather Department personnel disclosed that prevailing breezes at the school site were east and west. The building plan was then rotated slightly off the compass points to provide a washing effect through breezeways and buildings for the courts.

The new school was planned to house an ultimate capacity of 2,500, with an initial enrollment of 1,500



Site plan of the Carl Hayden School. Dotted lines indicate future expansion.

and spaces for expansion as the need arises. The area, on the above basis, resulted in 148,409 square feet of buildings, arcades and walks. Deducting the arcades and walks, there is a per student study area of 131,532 square feet, resulting in 87.68 square feet per student.

Back-to-Back Scheme

A detailed study of the plan and costs determined the advisability of using a back-to-back classroom plan with all utilities housed in a utility space running the length of the wings. All heating, cooling, electric and water lines may be installed here with room left for the air conditioning units which are recessed into the space. This area between rooms is lighted and has been made wide enough to enable a maintenance crew to work at repairs and service equipment.

The architects made design and cost studies of subgrade concrete walking utility tunnels in comparison with single loaded walks for one and two story classrooms. The cost studies proved that the back-to-back classroom idea was the most economical.

Strip windows are placed only on the classroom door side of the open walks. The sills of the windows are at top of door height, thus being over the heads of passersby and eliminating room disturbance by pedestrians. Before adopting this window arrangement, a survey was made of the desirability of natural light vs. artificial. It was found that even where there is ample natural daylight, artificial lighting is used. The final decision was that all back-to-back classrooms and areas would be designed for 50 foot-candles of light at working surface, using fluorescent troffers.

Bidding for the Work

Contractors' proposals were first requested on a 1,000 student plant, but even before bids were opened, the realization grew that the plant would be too small. The architects were requested to call back their bidding documents and increase the plant to a 1,500-student capacity.

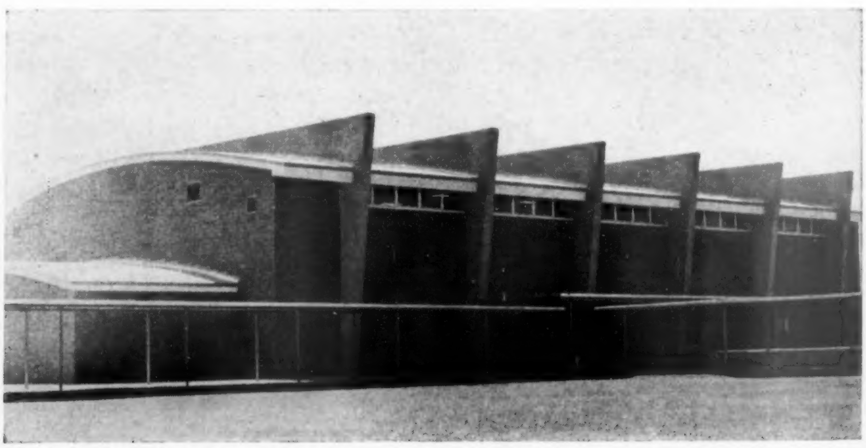
This was done and the proposals were obtained on May 1, 1956, as follows:

Weeks Construction Co.	$1,730,792
Homes & Son Construction Co.	1,768,413
P. W. Womack Construction Co.	1,790,912

The above low bid price of $1,730,792 included $145,000 for parking areas, ground improvements, irrigating system, etc.

The lowest price resulted in a per student cost for construction of $1,154, including all site improvements. This amount was considered to be exception-

Gymnasium building has concrete structural supports. Narrow strip windows are placed near the ceiling line.



Air view of the secondary plant shows relation of the building units to the 40 acre site. Wing at right houses the liberal arts courses.

Library of the school is located on the second floor of the combination library-administration unit. Outdoor stairways lead to the upper areas of the building.

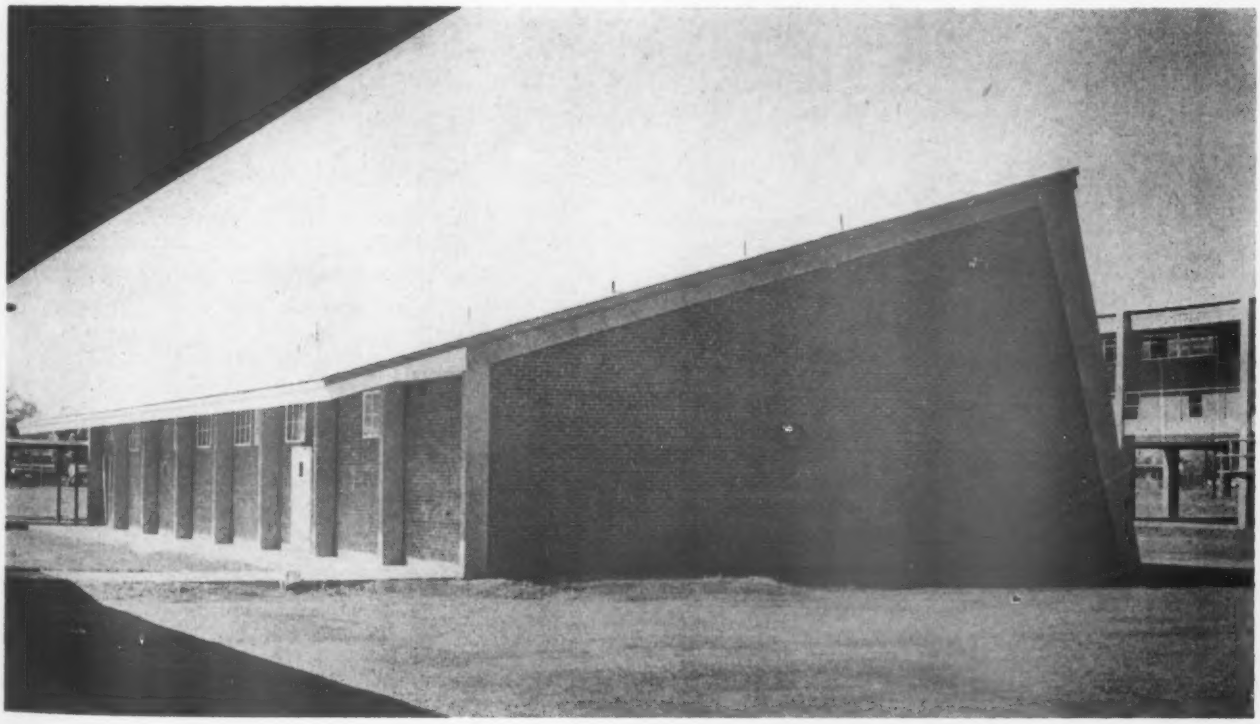
ally favorable in view of requirements. The entire plant was to be designed as a completely fire resistive group, fully air-conditioned with refrigeration type cooling for summer, and winter heating through a chilled or heated circulating water system.

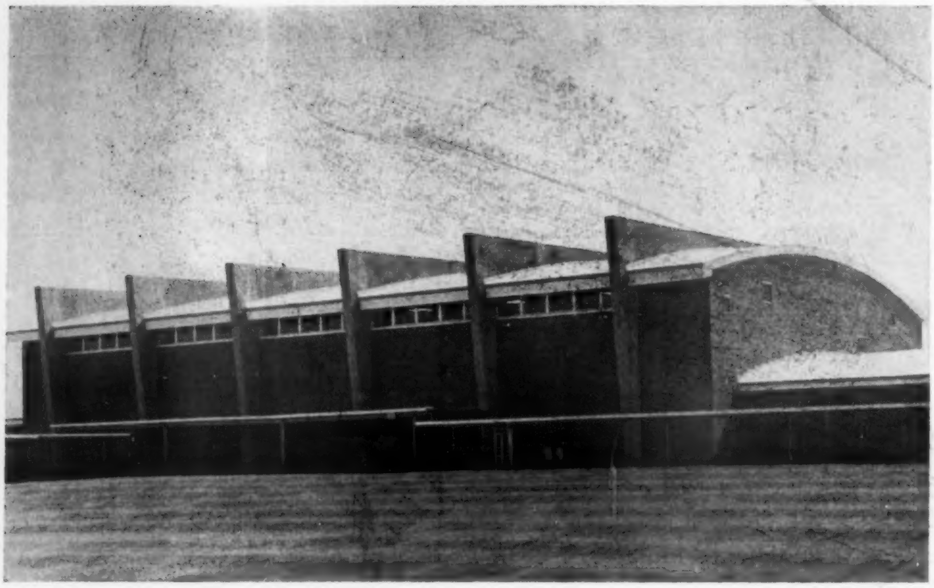
The square foot cost, including refrigerated air cooling, was $10.70, exclusive of site improvements or land and equipment.

A Fire-Resistant Plant

The type of construction used is class A–B or a fully fire protected structure, designed in accordance with the National Board of Fire Underwriters regulations and in conjunction with the National Board of Fire Underwriters, Phoenix personnel. This type of construction resulted in lowering the current insurance rate (as most present buildings are given a C-D classi-

The fine arts unit consists of four large rooms. An all glass façade on the highest wall fronts the north, opposite the sun's direction.





Pumps circulate 1,000 gallons per minute of chilled water from a 330-ton absorption unit to provide air conditioning for the Carl Hayden High School. Window area is minimum as units depend wholly on artificial lighting.

fication). The rate was lowered from \$0.126 to \$0.042 per one hundred dollars of insured value. A saving of approximately \$30,000 over a 25 year life of the plant at 3 percent interest will thus be realized. The construction materials will also mean a considerable saving in maintenance costs.

The Mechanical Plant

Refrigerated air cooling will be accomplished by pump circulation of 1,000 gallons per minute of 45° F. chilled water from a 330-ton Carrier absorption unit located in the central boiler house. Fan units of Drayer-Hanson manufacture are located in each classroom, laboratory, office, etc., throughout the complex. Each fan unit is separately controlled by thermostats, resulting in a flexible system for adjusting spaces to individual comfort desires. The heating cycle is accomplished in the same manner by circulating 1,000 gallons per minute of 140° F. water to all units.

Naming the School

Last, but not least, is the matter of the name selected by the board of education for this new school. Arizona's senior senator Carl Hayden is one of the oldest members in the United States Senate in years of service. He is highly respected and admired by the people of our state as well as by the senators with whom he works. Naming the new high school for Senator Hayden is a token of the respect held for him by the people of Arizona and by the city of Phoenix.

COLDWATER, MICHIGAN'S EXPANSIBLE HIGH SCHOOL

by E. BYRON THOMAS

Superintendent, Public Schools, Coldwater, Michigan

Mr. Thomas has a master's degree from Northwestern University. He has been the superintendent at Coldwater since 1948. Prior to this Mr. Thomas was a high school teacher and principal of Coldwater High School. He has just completed 25 years of service as a Michigan superintendent of schools.

and MALCOLM M. WILLIAMS

AIA, Warren Holmes Company, Architects and Engineers, Lansing, Michigan

Mr. Williams is a graduate of the College of Architecture at Cornell University. He became a partner in the Warren Holmes Company in 1946. His previous experience includes design in various offices and teaching in the Engineering College at Michigan State University.

COLDWATER, Michigan, is an attractive, midwest city of approximately 10,000 persons, situated twenty miles north of the Indiana State line on important US–27 at the intersection of US–112. It is influenced by a prosperous rural economy and by several industries, some small, but a few of nationally known products.

The Coldwater City Schools serve a number of rural areas annexed to the central school system. The district also operates over a wider total area of 12,000 persons with a tuition pupils' educational service.

The site of the new high school, formerly a private airport of 40 acres, was determined before the actual planning of the building. An adjacent 10.8 acres had been acquired previously by the school board for an athletic field. A sunken football gridiron, with bleachers and a press box, had been constructed here several years earlier. The site for the school lies in an expanding area of new homes in the northwest section of the city.

Ultimate access to the high school property will be ample. At present the southeastern approach, the most direct from the center of town, is restricted by the athletic field layout and small parcels of neighborhood property. The second important access, as developed, is from the southwest. Important access from the north is yet to be developed. Studies were made for site usage to locate the building, playfields (yet to be developed), parking, etc., and borings were taken.

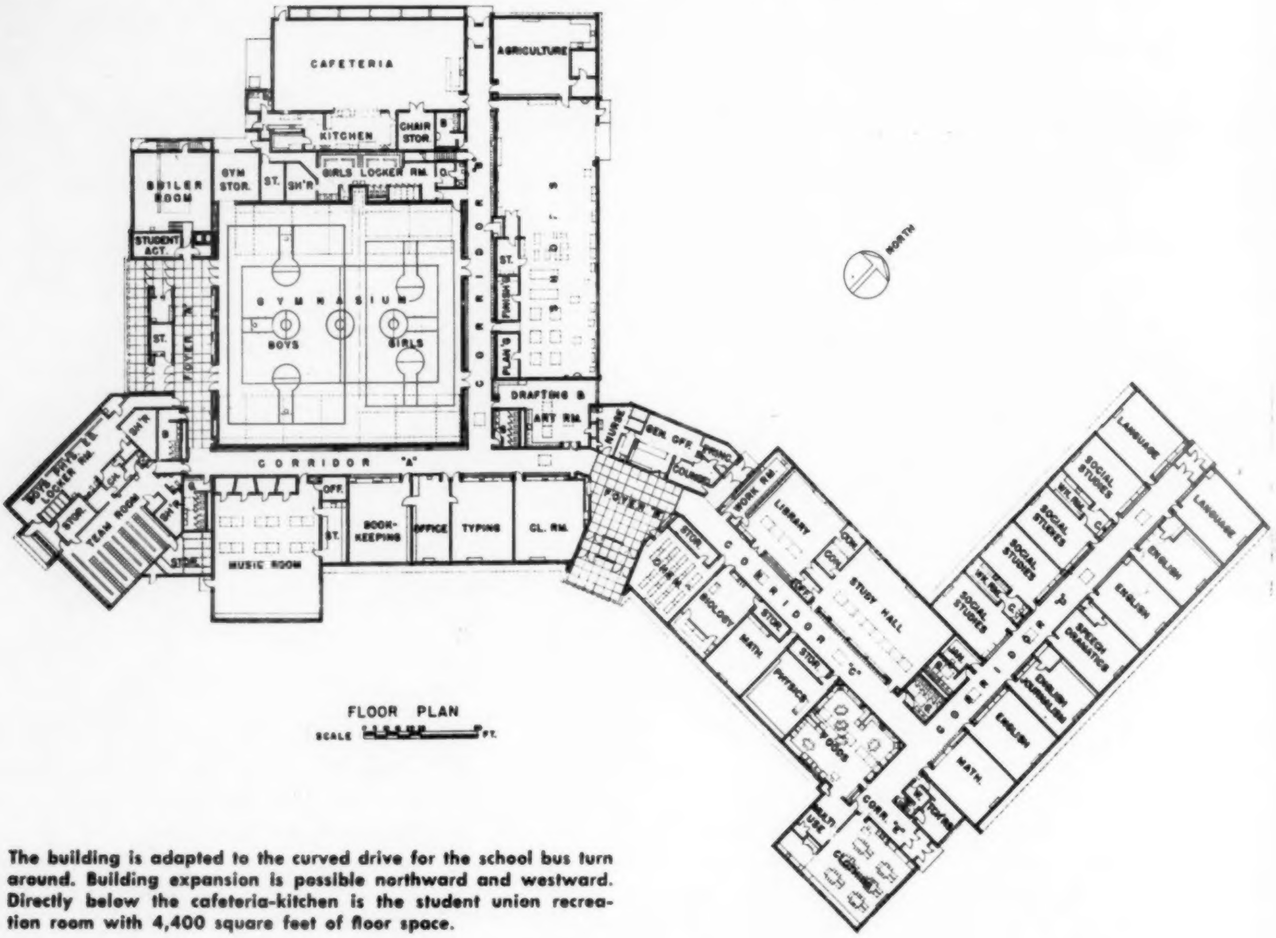
Planning the Building Spaces

It was decided to place the building in the southeast corner of the site, using that approach for the main entrance and the southwestern approach for the gym-

Breakdown of Areas

	Percent of Total Area
Administration	1.87%
Cafeteria	4.65
Classrooms	35.15
Corridors, Foyers and Vestibules	14.53
Gymnasium	15.51
Kitchen	1.51
Library and Study Hall	5.36
Locker Rooms	8.96
Shops	7.08
Service (Boiler Room and Receiving)	2.56
Toilets, Storage, Teachers Room	2.82
	100.00%

The new Coldwater High School, plus equipment, was finished at a cost of $988,575. The structure was designed by the firm of Warren S. Holmes Company.



The building is adapted to the curved drive for the school bus turn around. Building expansion is possible northward and westward. Directly below the cafeteria-kitchen is the student union recreation room with 4,400 square feet of floor space.

The main entrance foyer has a large, store front display window for exhibiting cooperative work-experience student projects and other special student showings. Informal furniture adds a casual touch.

A glass-walled conference room is located between two of the social studies classrooms. Small groups of students are able to work together on special projects in these rooms, which are situated for use by English and speech classes also.

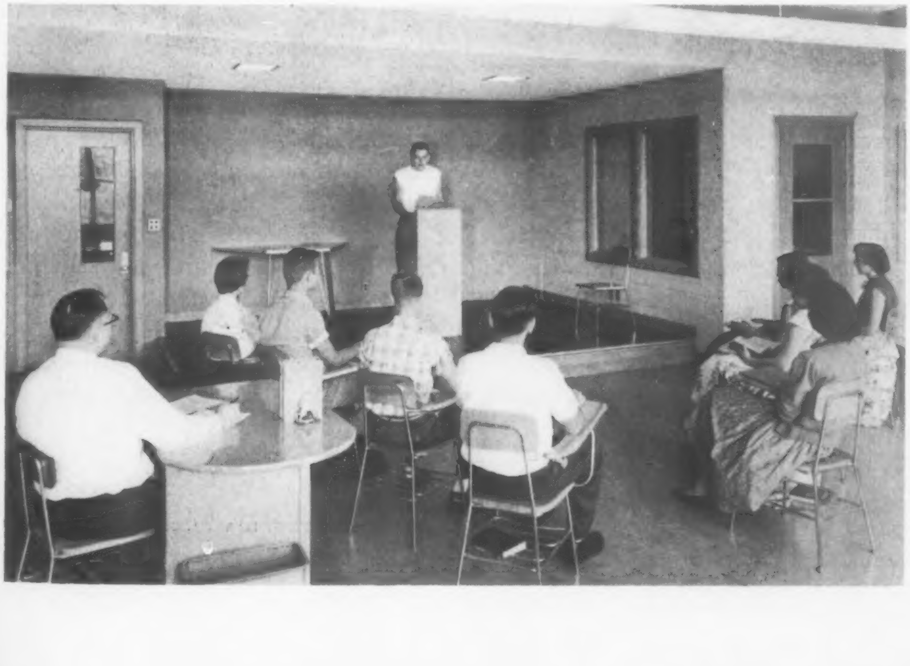
nasium entrance, parking lot and service. We wished to locate the boys' locker room close to the football field. Classrooms and laboratories were generally located east of the main entrance. Facilities having community usage or requiring service were placed west, with the high school administration at the center. This arrangement concentrated the noise activities in the western wing.

Upon the recommendation of the superintendent, the board of education commissioned the high school principal, Kermit Dennis, and the staff to work with the architects' educational consultant, E. B. Holden, to develop educational specifications. Cooperative conferences continued for fourteen months wherein studies of program function were matched with possible building facilities.

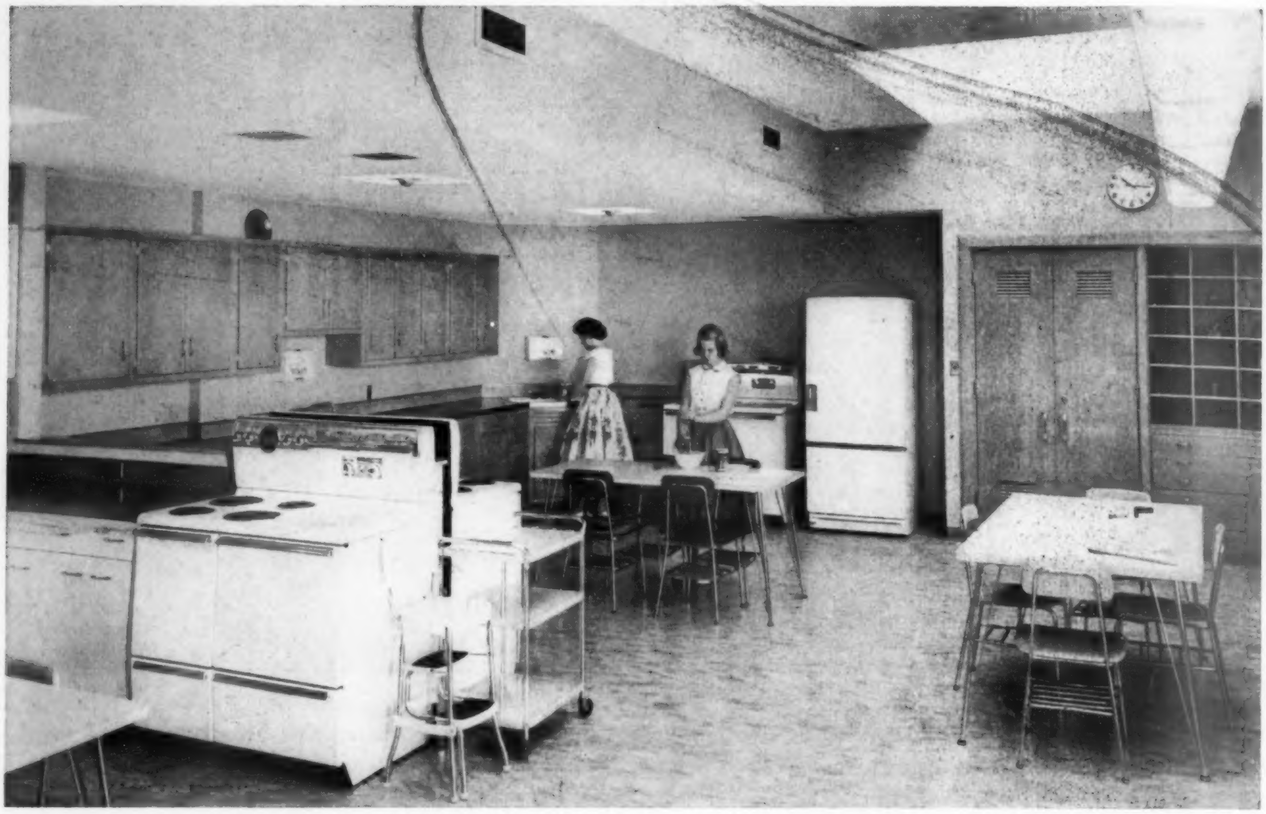
Financing the Structure

The first bond issue for $1,800,000, which was a package combining the high school with additions to two elementary units, was defeated. The architects, Warren Holmes Company, were instructed to revise their sketches on the basis of a modified program and estimated cost of $1,300,000 for just the high school building and equipment, excluding site cost.

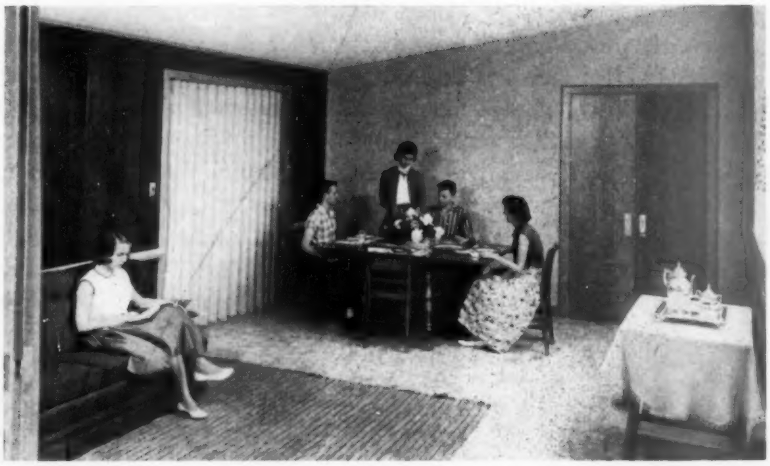
The modified program, intended to provide for 800 students in a four year high school, made it important to insure future expansion, and also to allow sufficient flexibility in building design for any later adjustments. All partitions in the classroom wing are non-bearing. The science department, admittedly small but highly multi-purpose for classroom use, can be readily enlarged



The speech and dramatics classroom has a raised platform at one end to serve as a stage or speaker's rostrum. Adjacent is a control room for tape recording and direction.



The foods laboratory, above, and the living area, at right, are part of the homemaking suite. The six unit kitchens are equipped for variety and are unusually spacious. The living area provides opportunities for the students to serve each other meals which they have prepared.



by scheduling the mathematics classroom, situated here, to another location.

Interior Space Allotments

Conference rooms for the English, speech and social studies courses make it possible for small groups to work together on special projects. There is a stage platform in the speech and dramatics classroom. Adjacent to it is a control room for tape recording and direction. Workrooms, with adequate storage cabinets and shelves, are located between the social studies rooms.

Guidance and counselling spaces are in the administration unit, supplemented by additional facilities for conference in the library-study hall area. A control panel for two-way sound communication is located in the administrative unit and serves all portions of the building.

Mechanical drawing and arts-crafts now constitute a dual-purpose unit, but will be separated when space becomes available. Drafting facilities will then become directly connected with the shops. The shop work area is designed without partitions as one total unit with 60 work stations to teach skills. Sufficient storage, planning and finishing facilities are included.

Commercial and Homemaking Areas

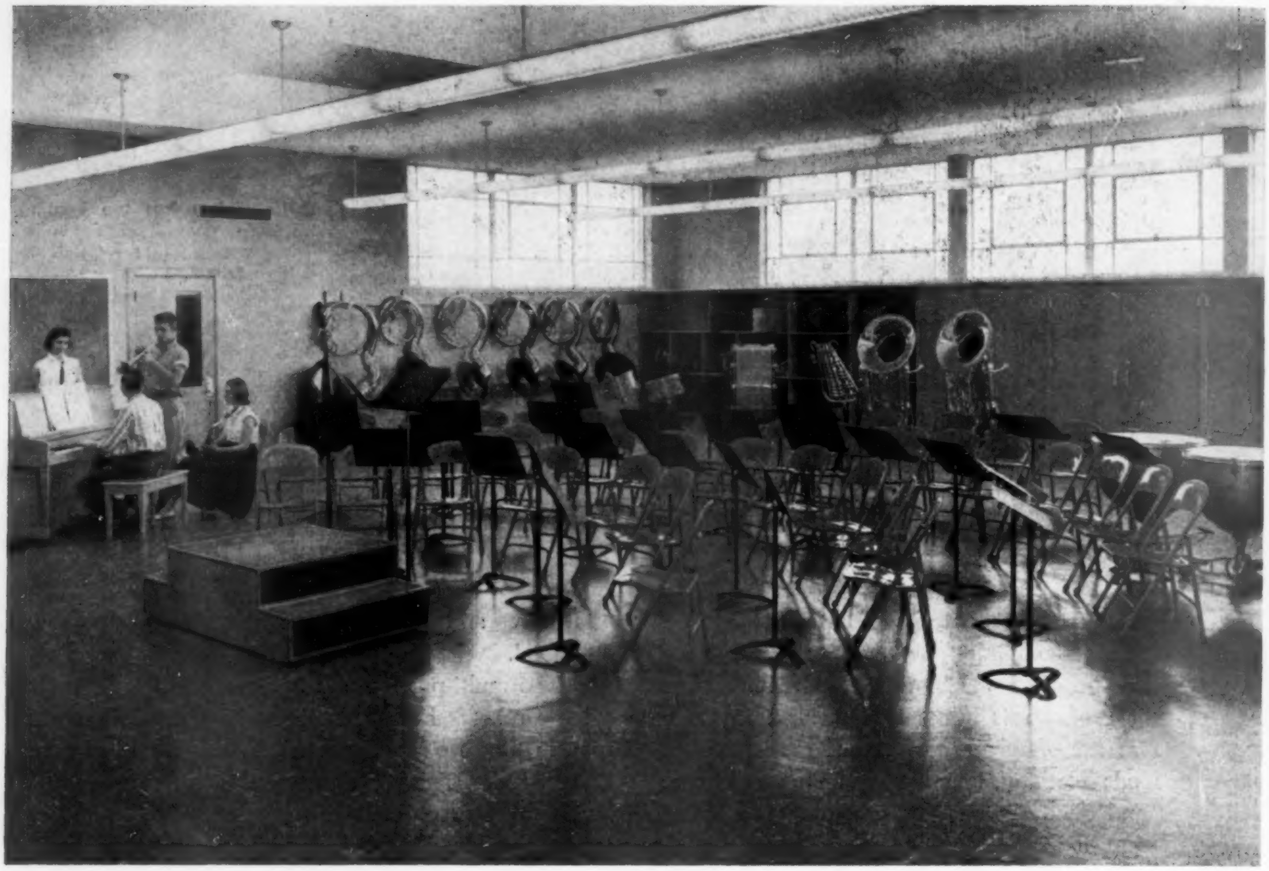
The commercial rooms are of generous size and are near the administration unit. The program taught here

The library has top lighting, as do several of the other larger rooms in the Coldwater High School.

is designed for integration with local business employee needs. There are rooms for typing, bookkeeping, office practice and business machines. The reimbursable homemaking program is adequately housed in three rooms. There are simply arranged but efficient work areas for foods, clothing, laundry, grooming, child care and home and family living. The grooming and fitting space is arranged for demonstrations and can be separated by a folding door. The six unit kitchens vary in treatment and are unusually spacious and well equipped.

The multi-purpose music department is housed in a large rehearsal room, having adjacent small practice rooms which are sound-treated, an office and instrument storage room. There is direct access to the outside athletic field. Storage of large instruments, robes and uniforms is provided in cabinets at the rear of the rehearsal room.

Exhibit cases in the spacious gymnasium foyer of the high school serve to display the many trophies and awards received by student teams. The foyer has a separate outside entrance, apart from the main entrance.



The multi-purpose music department has a large rehearsal room with small practice rooms adjacent. These are sound-treated. Large instruments, robes, music and uniforms are stored in the cabinets at the rear of the room. The music room has its own entrance to the outdoors.

The cafeteria is a large multi-use room, seating 250 persons for meals. At the school noon period more than 500 pupils are served lunch. The kitchen is adjacent and is a commercial, labor-saving, compact, well equipped unit. It is capable of preparing canister meals for other buildings in the school system, while serving the noon lunch to the high school population.

Student Recreation Room

Directly below the cafeteria-kitchen is the student union recreation room, with 4,400 square feet of floor space, direct exit to the outside, toilet and storage facilities. This room is equipped, managed and operated by the student government and for the students.

The physical education department has a spacious accommodation, since this is an area where future expansion would be difficult to implement. A divided gymnasium seats 1,700 for varsity events. It has a press box accessible from the bleachers and equipped to connect with the telephone and broadcasting facilities in use.

The two team rooms have an ample space allotment. The arrangement of office, training room and all kinds of storage enables the coaches to supervise all activity in the locker rooms. The referee and coaching staff have dressing facilities here also.

The building shape is adapted to the curved drive for school bus turn around, entering from the southeast for the main entrance. Building expansion is possible northward and westward. Several of the larger rooms are toplighted, including music, art, the library, the study hall and the foods laboratory. Top lighting in the corridors achieves a pleasant atmosphere.

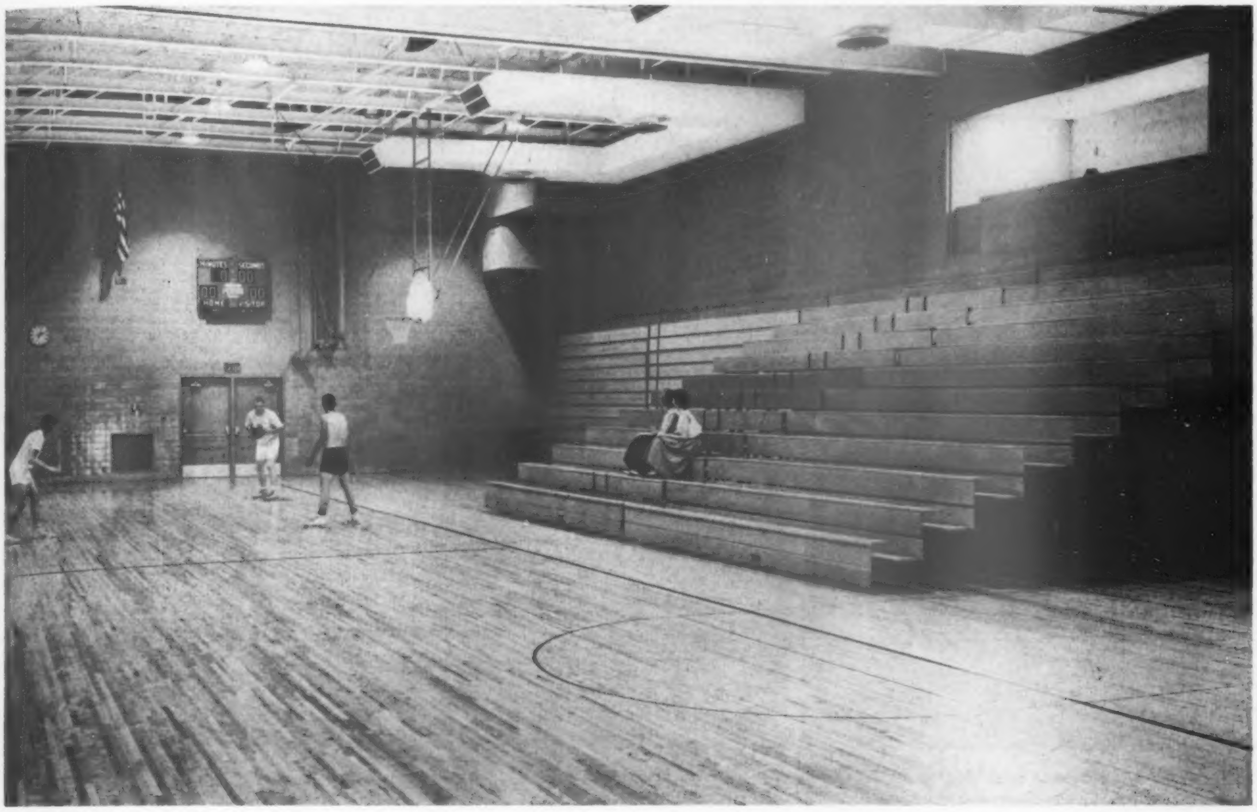
Construction Materials Used

Construction materials were selected to create an attractive building and also with attention to reduction of maintenance costs and economy in insurance rates. Floors are terrazzo in corridors, locker rooms and toilets. Asphalt tile, in an attractive color pattern, is used in the classrooms. The gymnasium, kitchen, locker rooms and corridors have structural facing tile wainscots or walls.

Interior partitions are slag block, except in the corridors where they are plastered. Classroom walls below the chalkboard also are protected by structural facing tile. All classroom and circulation areas are acoustically treated.

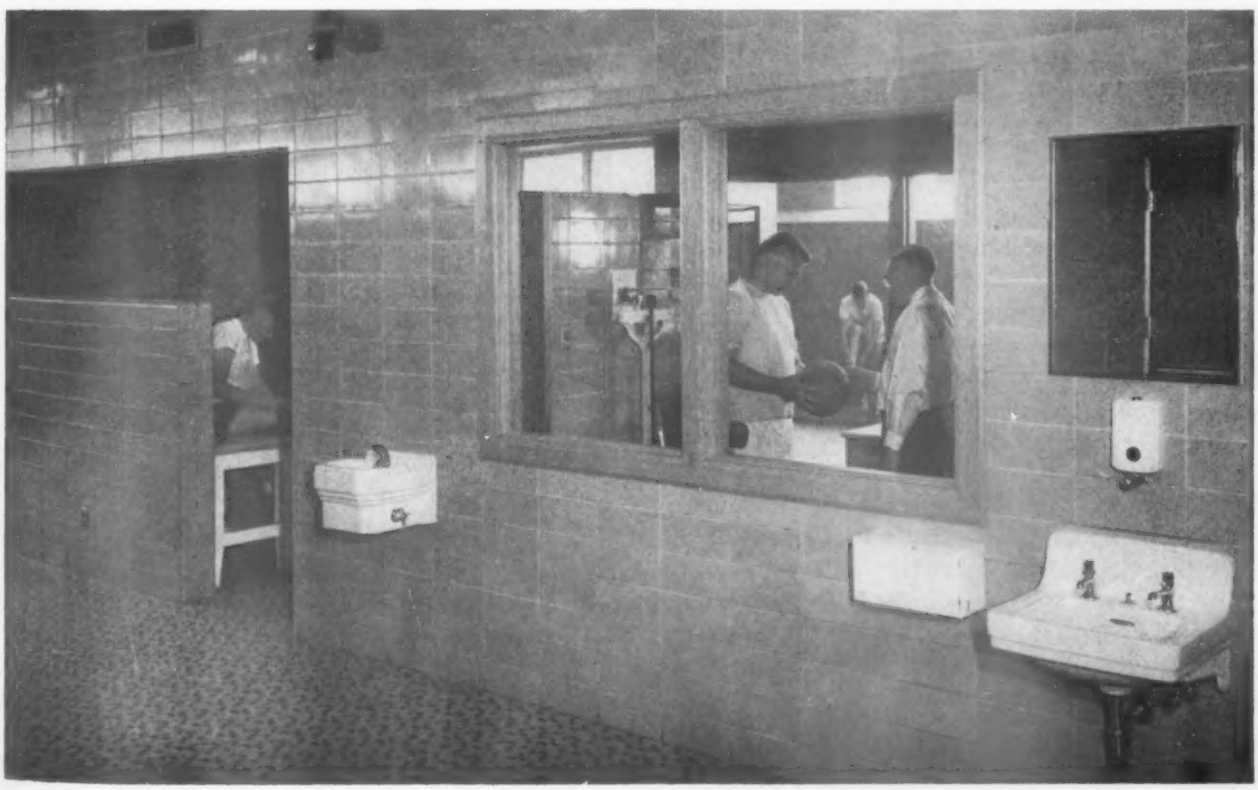
A Pleasing Appearance

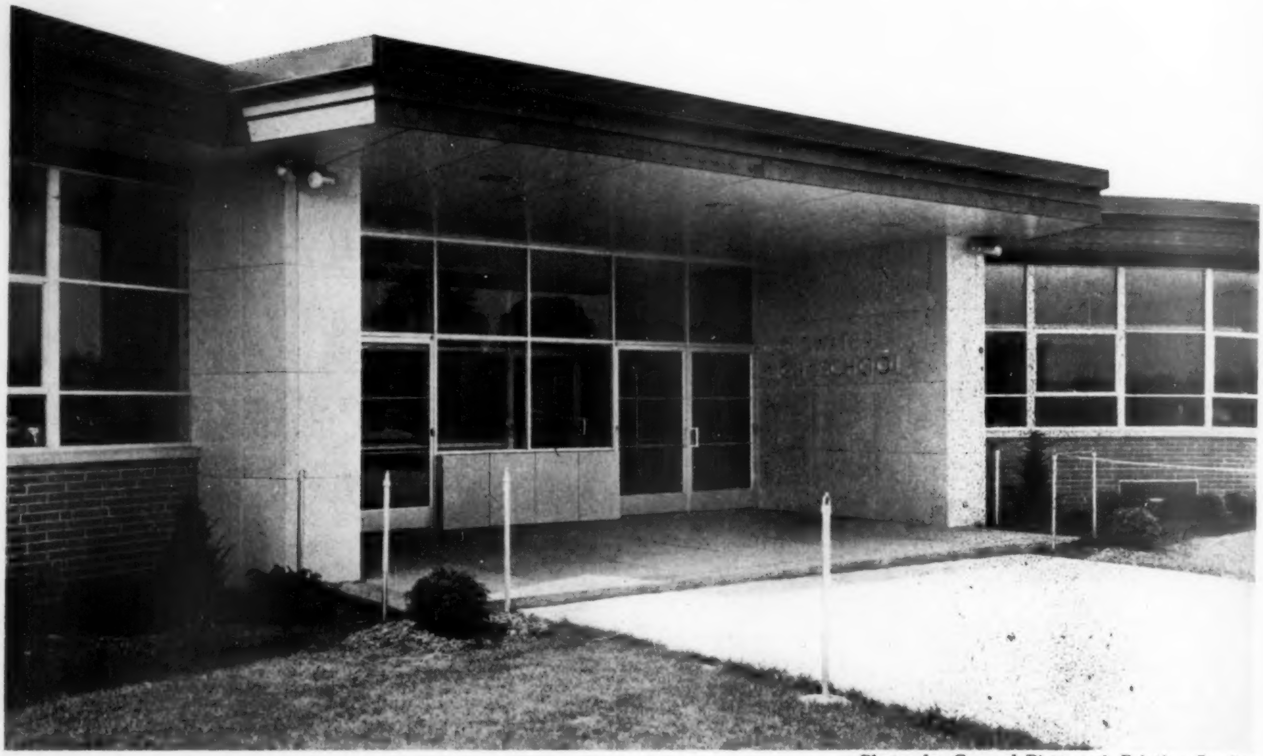
Foyers of the building are made pleasant with brick walls, large glazed entrances and ample display



Folding bleachers accommodate spectators in the gymnasium. A press box, equipped to connect with the telephone and broadcasting facilities in use, is accessible from the bleachers.

All activity in the locker rooms may be supervised from the coach's office, seen through the glass wall partition. The walls are constructed of glazed structural facing tile. The referee and coaching staff also have dressing facilities in this area.





Photos by General Pictures & Printing Services

Coldwater High School was dedicated on October 21, 1956. The school site lies in the northwest section of the city in an expanding area of new homes. The school was constructed to house a student enrollment of 800, but will be expanded when necessary.

facilities. The main entrance foyer, particularly, has a large store front display window for cooperative work-experience student projects and other special student displays.

Warm and Fresh Colors

Colors used are warm and fresh. The exterior appearance is heightened by the use of redwood fascia and porcelain enamel panels at the main entrance and all window mullions.

The Total Cost

The Coldwater High School cost a total of $988,-575, with unit costs of $12.80 per square foot and $0.85 per cubic foot. Bids were taken August 17, 1954, and school sessions began on September 6, 1956.

TEAMWORK MEANS PROGRESS FOR WASHINGTON COUNTY SCHOOLS, MARYLAND

by WILLIAM M. BRISH

Superintendent of Schools, Washington County, Maryland

JOHN W. McLEOD

McLeod and Ferrara, Architects, Washington, D. C.

After studying architecture at Columbia and New York Universities, John McLeod formed a partnership with Anthony Ferrara and began independent practice in 1936. Both men studied school planning at Teachers College, Columbia University.

and N. L. ENGELHARDT, JR.

Engelhardt, Engelhardt, Leggett and Cornell, Educational Consultants

Dr. Engelhardt is a graduate of Yale University and received his M.A. and Ph.D. degrees from Columbia University. He has had a varied and full career in education. He has been a professor and lecturer at the University of Wisconsin, University of Florida and New York University.

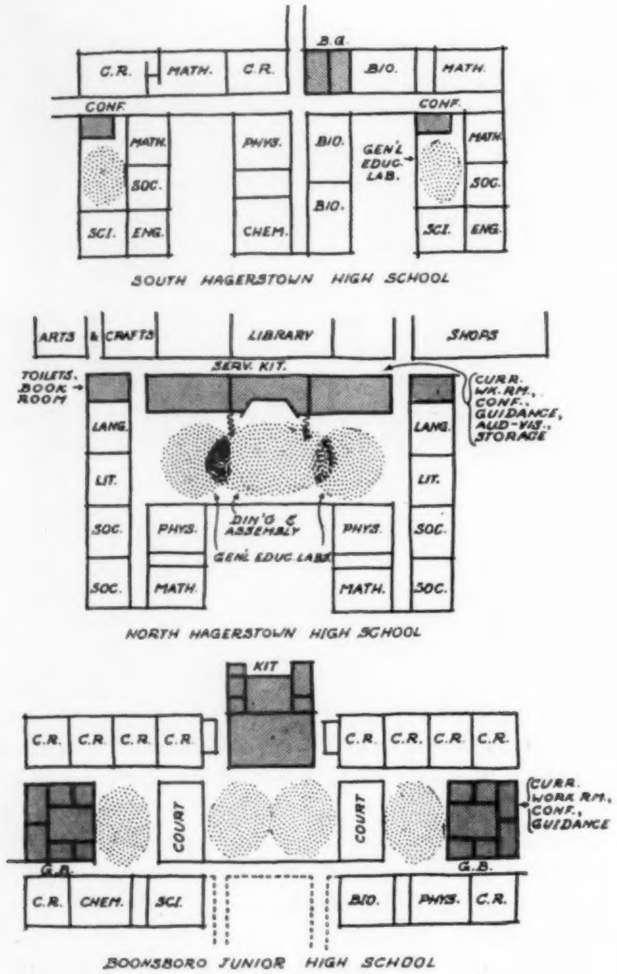
A TEAM of educators, architects and specialists is continuously at work on the schools of Washington County, Maryland. Who are they? How do they work? What are the results?

Like most American school districts, Washington County, Maryland, has its troubles. For several years, although the problems have been pressing and the breathing spaces between them few, the superintendent, William M. Brish, consultant N. L. Engelhardt Jr. of Engelhardt, Engelhardt, Leggett and Cornell, and architect John W. McLeod of McLeod and Ferrara, have worked as a team, not only on these immediacies but also on plans for the future that is always over the horizon.

In the heat of activity the team has had to hammer out a working philosophy of education, to translate its theorems into administrative and architectural practicalities—and then has had to get the buildings built. The foundation of the work is a continuing survey made by the consultants and the school system personnel. This has provided several kinds of data, for instance, a continuous check on enrollments. Predictions made in 1954 proved remarkably accurate in late 1957, date of the most recent survey: 10,106 elementary students predicted, 10,162 actually enrolled; in secondary schools, 7,161 predicted, 7,514 enrolled. Predictions of population distribution among the county's forty-eight schools have also proved accurate with few exceptions. Plants, programs and procedures have been continuously evaluated and improved, usually enough in advance of needs to prevent seriously critical situations from developing.

Chosen for Experimental TV

The county's schools include both urban plants in the city of Hagerstown and rural schools. The buildings range in age from seventy-five years to North Hagerstown High School, now under construction, and



Three new high schools which have been planned for Washington County are South Hagerstown, now in use, North Hagerstown, under completion, and Boonsboro High School, recently designed. Basic "little school" plans for the three plants are shown above. South Hagerstown High School, see below, was occupied in the fall of 1956, and is designed for an enrollment of 1,700.

Boonsboro High which is being designed as this is written. The system has recently been much in the news. The Fund for the Advancement of Education and the Radio-Electronics-Television Manufacturers' Association picked Washington County in 1956 for a system-wide experiment in educational television. As a result of the extensive publicity, so many educators, board members and architects have thronged to Hagerstown, that providing satisfactory guides for school tours has become an administrative headache.

But exciting as educational television is, exhausting though the job of trying to integrate it into the program has been, the schools have to keep reminding themselves that this technique, admittedly important to explore, is no substitute for a philosophy, a program, a plan. Schools have taken care to keep television from dominating all activity.

When Washington County's schools were chosen and the announcement was made public in Hagerstown, the whole town wore a broad grin. This was indeed an honor. Yet, if the team had not been at work for several years, it is doubtful if the distinction would have been conferred on the county. Many of the factors which influenced the award—the nature of the population, its income level, the area's resources, geography, size, etc. —had previously been investigated and had already influenced decisions as to the kind and quality of schools.

The prime motive for the process of educational analysis and action was, as it is in many school districts, the urge to improve conditions in the face of rapidly growing needs. That times are changing with accelerating speed, that the number of pupils is multiplying, that new techniques are needed for dealing with large enrollments, that the "education" a pupil receives can be obsolete by the time he "graduates"—while the work

Fred J. Maroon

progressed, ideas like these began to be understood as they affected Washington County. By now it is possible to formulate a few principles.

Principles to Follow

1. Our environment, social, technical, economic, cultural, is changing with accelerated rapidity. Educationally we cannot deal too much in specifics because these quickly become outdated. *We must increase the emphasis on principles in any area of learning.*

2. We have many more students. Merely expanding a system intended for a smaller number and enlarging the existing curriculum may produce more "graduates," but what will they be worth? *Both the individual and society as a whole are entitled to schools in which each child has the opportunity for his own potentialities to develop fully.*

3. The complexity of our industrial society produces a multiplicity of facts and knowledges. *It is important to select from the great variety the experiences that are appropriate and valuable.*

4. The process of change is continuous; educational planning and programming should be continuing functions. *The program should provide teachers more time for planning and facilities should encourage teachers to plan together.*

5. The worth of the specialist, who is necessary in today's society, is increased if he understands the interests and needs of others. *The various learnings need to be interrelated and coordinated.*

As planning for a succession of schools has progressed, it has become impossible to say that this member of the team produced this idea, that one produced that. In general, the educational consultant supplied a broad knowledge of the field and buildings required, familiarity with a great number of similar situations more or less successfully met elsewhere, experience with profitable survey techniques and preparation of educational specifications and, highly important, the ability to give constructive criticism at critical stages of the development of a design. This last was based on sound understanding of county problems as well as on general knowledge.

How the Planners Contribute

The superintendent and individuals on his staff whom he brought in from time to time, like other principal members of the team, supplied the intimate knowledge of local aims and problems which only an "insider" can possess. Knowing well the personnel, physical and financial resources available, necessarily closely in touch with the problems of scheduling, assignments and all the other administrative work that is intensified when the program is improved and buildings are built, the superintendent has been intent also on keeping the county educationally abreast of the times.

The architect has contributed his special knowledges of structure, equipment and finishes. His ability to organize the required spaces into buildable structures, to visualize and picture so that others could comprehend what their proposals would mean in terms of buildings, has been both a stimulus and a balance.

But all three groups have contributed more than their specialties. Each has become familiar with the fields of the others and the team has consequently become most effective. Since each also respects the special competences of the others, there is no feeling of intrusion when the consultant says "We need a different kind of lighting here"; or the architect cocks an eyebrow sceptically at the number of square feet specified for a

Fred J. Maroon

North Hagerstown High School has four little schools placed around a central resources core.

laboratory and the superintendent interjects "Yes, but these labs must work for the junior college, too."

Some of the most fruitful planning sessions have taken place in the architects' office. There the data and specialists for such technical matters as land use, structural, mechanical and electrical work, etc., are quickly available. The landscape architect, the engineers, the architects' job captain, the equipment specialist can sit in at appropriate times, usually during early design sessions. Participating in making decisions gives them a clearer understanding of a project than they would have if instructions were received second-hand.

While this procedure does take time during the preliminary stages and may seem cumbersome, in the long run it has probably saved time because it eliminates many misinterpretations. Thus to see their work in relation to the whole job stimulates the specialists' imaginations, often increases the value of their contributions, and assures coordination and integration of their tasks. This understanding can mean substantially improved functioning of the school plant as well as improved design quality at reasonable cost.

Translating Educational Principles

Before buildings take shape, general educational principles have to be worked over into practical requirements. What do the generalities mean educationally and architecturally? These questions have had to be sufficiently thought through to permit the drawing up of detailed educational specifications. The answers, however, have been kept flexible enough to allow for modification and improvement during planning sessions. It might seem more efficient to make hard and fast decisions before planning starts, but the team members have found that the stimulus of working together constantly produces more effective, simpler, or less costly ways of doing things. It has been profitable always to seek better answers to such questions as: How do the shops and labs fit into the scheme? What can we do to improve guidance, which is extremely important in a program centered on the individual? What about eating problems? . . . and so on.

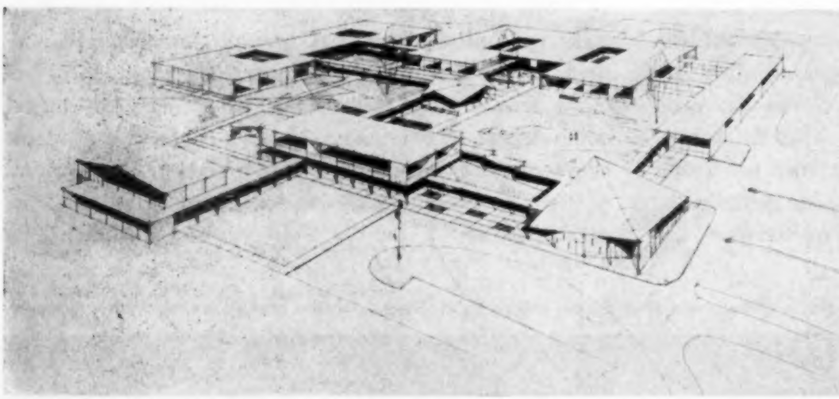
Like many other places, Washington County had gotten into the habit of working educationally with such standard elements as length of class periods, class sizes, methods of instruction, classrooms themselves. As new techniques came along, audio-visual methods and equipment, for instance, they were superimposed on what existed. But as the philosophy changed it became evident that, in some cases, students might absorb all they could take in one dose in an intensive fifteen minute session, and the rest of the standard period would be spent marking time.

In such a case, although the utilization ratio might appear to be an excellent percentage, it actually presented a false picture. Or another type of work might require periods longer than standard for preparation, practice and clean-up. Similarly, some things, it was perceived, might be better learned in large groups, others in classes of standard size, still others in very small groups or even solo.

Instructional Methods Vary

Instructional techniques, all the team members understand, have become ever more varied, developing far beyond the textbook-recitation methods of only a short time ago. Not only are "conventional" audio-visual aids available; there are globes, maps and all sorts of pictorial media. Doing things to and with and about subject matter means practice in using the things learned; it relates the different kinds of learning to each other; it supplements, though it cannot ever supplant intellectual exercise; it may require equipment for the arts and crafts to be available immediately to the classroom rather than in distant shops and laboratories; it may similarly introduce simple scientific apparatus into the general instructional area; the least it means is a sink in almost every classroom at not just the elementary level but also in secondary grades; plus storage facilities, rails for maps, shelves, cabinets and racks; plus display space for inspirational and instructional materials and for students' work.

All these variables of class size, period duration and teaching methods seriously complicate one element which standard numbers, time spans and techniques had previously facilitated—scheduling problems. Once



Each "little school" in the Boonsboro High School will have a general education laboratory. Two schools will share a single but divisible eating-assembly area. There is a minimum of corridor space.

the "variable" concept has been adopted, the school administration finds that routine scheduling is impossible. So it has increasingly become in Washington County as the number of standardized procedures has been reduced and a more flexible program, tailored more to the students' needs, has been adopted.

The norms have not been entirely discarded and probably never will be but there is, even this early, a continuing effort to regard them as norms from which, for good reason, departures may be made. Scheduling has become a creative, not a routine job. Fitting together the appropriate time sequences, organizing them into profitable days, has required administrative ability of a quite different kind than filling in opportune blank spots in a class-period chart.

Impact of Educational TV

Educational television superimposed on the creative educational approach has intensified many of the problems, particularly as the television program has been expanded from the eight schools and 6,000 pupils participating in September, 1956, to the forty-eight schools and 18,000 pupils—the entire system—who are expected to participate in September, 1958. How long should television classes be? How large a television class? What kind of technique: classroom pickup or central studio, lecture or demonstration, classroom monitor or classroom teacher? Decisions had to be made, personnel found and trained, the buildings equipped and in some cases modified. North Hagerstown High School was virtually designed at the time; South Hagerstown High was under construction. Certainly these new structures should incorporate all the facilities necessary for television.

Underlying all of this was a gradually broadening concept of guidance. The team was not satisfied with guidance as a lofty phenomenon, a brassy, top-echelon department. The educators on the team wanted a down-to-earth guidance program, one that would be an intimate part of each student's hourly activity. Guidance, they felt, should be unobtrusive yet always at the student's elbow. Similarly, administration should be close to the individual student; it should convey the feeling that it was truly working for each student's benefit, that it was to be respected but not feared.

Schools-Within-a-School Plan

At the high school level, the team found in the schools-within-a-school plan solutions to most of these problems. Some questions affecting the entire system were not so simply answered, but this type of thinking is increasingly being applied. To restate the nature of this plan briefly:

To gain the advantages of bigness, fairly large enrollments are needed in secondary schools; to recapture the intimacy and personal attention lost when the small school is merely expanded, the large school can be subdivided into several smaller units each with its own building, faculty, administration and guidance program. In each unit a limited number of students can participate in the learning experiences common to the group. Specialized facilities, and those too extensive to be duplicated for each unit, can be provided centrally for all the little schools to use in turn.

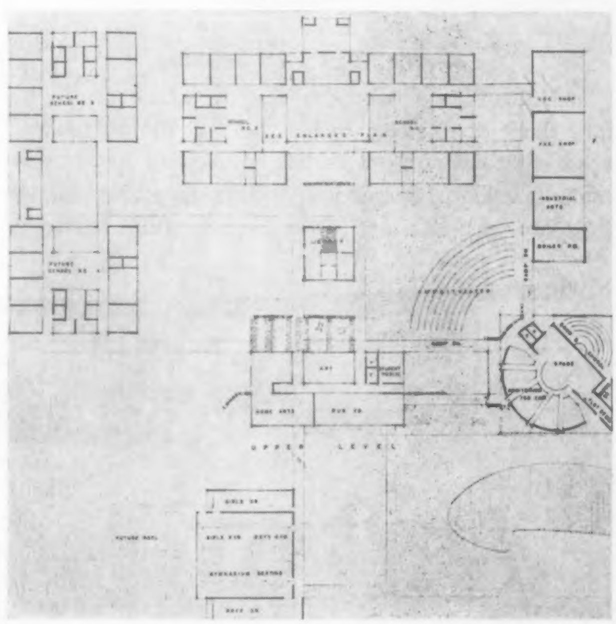
Three of the county's secondary schools illustrate the development and refinement of these ideas as the team has learned many ways to improve and a few to discard.

South Hagerstown High has little schools which share certain special facilities—a science unit, shops, additional classrooms, physical education plant, cafeteria, auditorium, administration, etc. A junior college on the same campus also shares some of these, which helps to avoid expensive duplication. It was occupied in the fall of 1956. It cost $2,576,000; it was designed for 1,700 secondary school students in grades 9, 10, 11 and 12.

North Hagerstown High, designed in 1956, will be occupied in September, 1958. It is composed of four little schools arranged around a central resources core. In the resources group, organized around pleasant courtyards, are the industrial arts shops, homemaking, library center, television center, electronics lab, drafting and arts and crafts studios. Closely connected are clothing and foods labs, administration suite, commercial classrooms and central kitchen; slightly farther from the little schools are the gymnasium and auditorium. Farthest away are the vocational shops. The entire set of buildings is more closely knit than is the case at South High.

At North High the little schools are more complete

Library and auditorium units of Boonsboro High border on a court which contains an amphitheater.



entities, each containing science, math, social studies and language suites surrounding a general education laboratory. The building program is more fully developed around a non-departmentalized curriculum. There is a central kitchen but only a minimum of central cafeteria space, because (as a look at the plan shows) most students are to be fed in two dining-assembly areas which join the general education labs. In fact, these two spaces and the assembly area are separated only by folding walls; all three can be thrown together, or any two, thus making a larger general education lab occasionally available to one or the other of each pair of little schools. Food will travel to each eating area on serving carts which will fit into the counter of a small serving kitchen. Dishes will be washed and stored at the point of use, in the serving kitchens.

The large auditorium at North High was included in response to community demand; it is expected that the two assembly-area stages will suffice for all normal educational purposes. Except for such specialties as the commercial suite, North High's classrooms are contained entirely within the little schools, while at South High many of the departments have their independent blocks of classrooms.

At North High, also, there are guidance, conference, audio-visual, and curriculum workrooms in each little school. All these functions are closely related to the small student body of each school. Each general education lab has a sink, work alcoves with counters and cabinets, storage space, etc.; it can be set up with work or conference tables, left clear for large projects, used in a variety of ways. It has bookshelves which can become, in effect, a branch library. It is a place where the brilliant student can work alone on advanced projects, the slow learner may receive special help; where a group may work cooperatively. It is to be the student commons; it is expected to do much to integrate all the learning experiences.

North High's TV Studios

North High's television studios, which are to tie into the closed-circuit system linking all the schools, are likely to attract the visiting public and are also potentially valuable instructional aids in themselves. Hence they are placed where they are accessible from the public entrance, near the general administrative offices for easy supervision, yet convenient to all four little schools. The electronics, arts and crafts rooms adjoin so their facilities will also be available to the television studios and vice-versa. A wide corridor fronting on a courtyard serves as both a television-studio lobby and a display area.

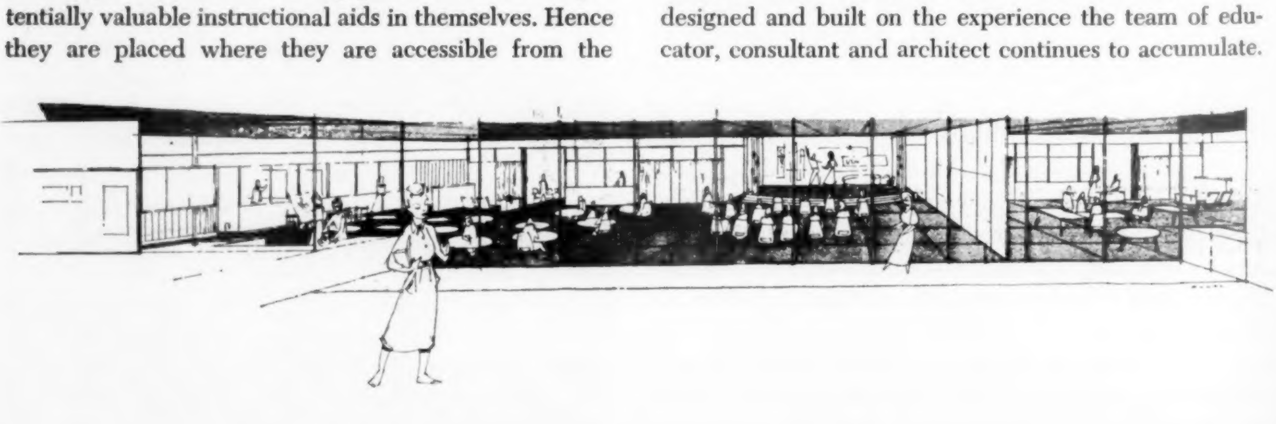
At present the general education labs at South High, limited though their concept, can serve many purposes: research and discussion groups, tape recordings, visual aids, educational television, basic arts, crafts and science, dramatics (on folding stages), conferences in glass cubicles. This summer the faculty of North High is to hold a summer workshop, to train themselves to take full advantage of the much different opportunities the new high school will afford come September.

Boonsboro High School

The little schools which will make up Boonsboro High have undergone several metamorphoses as problems were worked out first in South Hagerstown, then in North Hagerstown High. At Boonsboro the paired little-school plan will be retained; the classrooms will remain in the little schools, the decentralized eating program will also operate. A larger proportion of space will be used for guidance and similar functions. The greatest difference is in the general education-eating-assembly space, which is subdivided because this is expected to increase its usefulness and to allow closer relationships between classrooms and general education area. Each school has its own general education lab; two schools share a single but divisible eating-assembly area. The three areas thus created are to be separated by glass-walled courts. Notable in the Boonsboro plan is the very small amount of corridor.

Experience Builds the Future

Meanwhile the progress of students who have participated in the television program can be compared with the achievements of those who have not; the results can be weighed, and perhaps we will have found another valuable educational tool. The next school will be designed and built on the experience the team of educator, consultant and architect continues to accumulate.



SPECIAL AREAS FOR SPECIAL NEEDS

THE STRESSES of the missile and space age are upon us. Special areas of school buildings take on added significance in view of the special needs that arise from day to day. Yet, any one type of special area must not eclipse the overall school program, which is designed to encourage development in many fields.

Facilities for physical education, libraries, science, shops, music and homemaking, among others, equally require good planning and design, whether being incorporated within new plants or added to existing structures. Recommendations and practices by able educators and designers, experienced in many kinds of special areas for school buildings, follow. They will prove to be helpful planning aids.

Photos by Marsden H. Gribbell

Never before has the study of science in high schools been under such close scrutiny by the whole nation. With almost our very existence dependent upon progress in science and engineering, facilities and courses of study for high school science should be examined and evaluated.

A TEST FOR HIGH SCHOOL SCIENCE FACILITIES

by KENNETH E. VORDENBERG

Supervisor of Science, Secondary Schools, Cincinnati Public Schools

Kenneth Vordenberg has a Bachelor of Science degree in Education from the University of Cincinnati. He also holds a Master of Education degree from the same university. He has participated in science workshops at Harvard University and the University of Chicago. Mr. Vordenberg is a fellow of the American Association for the Advancement of Science.

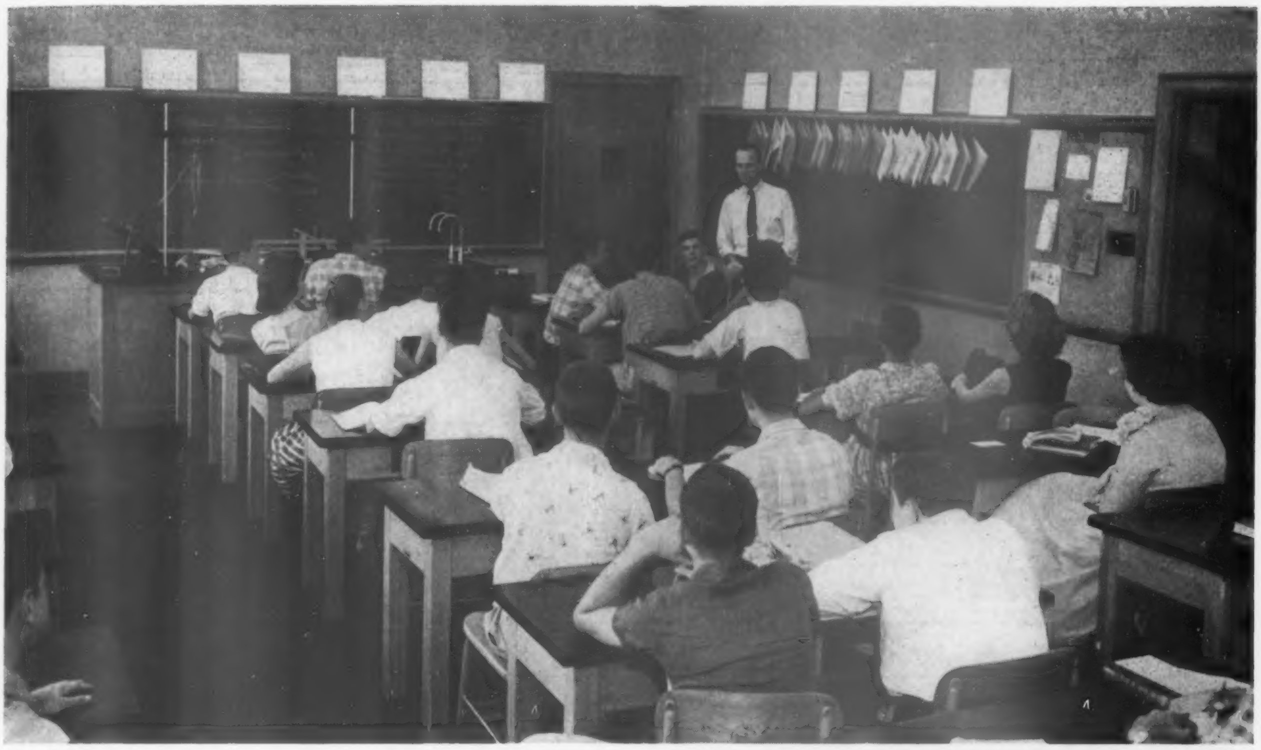
ARE our high school science facilities adequate? This is a question of large order. There are several aspects to consider—the size of the room, the physical facilities, their flexibility of use and the science equipment and supplies available.

A science program should provide opportunities for student experimentation, teacher and student demonstrations, project activity, group work, student responsibility for the care of aquariums, terrariums, animals, cork and chalkboard, work with many reference materials, use of science equipment and space for displays of student work.

The general science room at Woodward High School, Cincinnati, Ohio, was designed by the architect of the school, Charles F. Cellarius. The building has been in use for four years. Four other rooms, similar to the general science room, are used for biology, botany, physiology, zoology (in grades 9–12) and science and health at the seventh-eighth grade level.

The science room is 40′ long and 23′ wide. There is a demonstration table, 8′ by 30″ by 37″, with water, gas and electrical outlets. Twenty-one 2-student tables, 30″ high, 22″ wide and 54″ long, are provided in three vertical rows of seven tables each. Chairs with bookracks underneath provide the seating. Forty-two students may use the classroom at one time.

The 2-student tables are excellent for project activity and group work. They may be moved about to accommodate four, six or even eight students working as a group. Adequate flat surface space is provided and students may share learning experiences, use the many reference materials, work on projects, or carry on dis-



A demonstration table, chalkboard and bulletin board space and an adjacent preparation room are features of this high school room for general science.

cussions of science problems. The table surfaces are excellent for microscopic work or for dissections in biology.

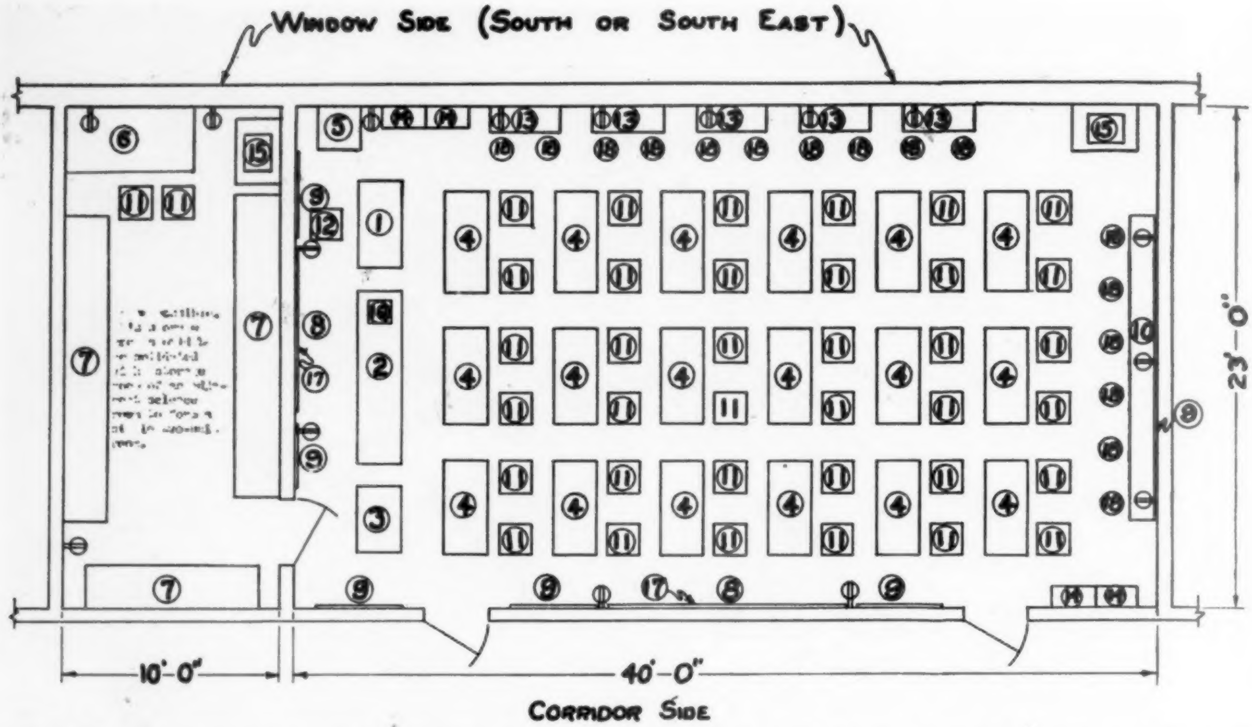
Tables and Display Facilities

The teacher's demonstration table offers enough space for demonstrations visible to the entire class. It holds specimens and materials that students need in their work. Gas, water and electricity are provided for all such needs. A microprojector can be used with base projection, and groups of four to ten students may stand around the table to view, at the same time, whatever the teacher wants them to see.

Chalkboard directly behind the demonstration table is used to supplement demonstrations and to list the responsibilities that students of the class have in regard to apparatus, aquarium, books, plants and displays. Charts are temporarily mounted on map rails and are available when needed.

Tables, 37″ high and 16″ to 18″ wide, are placed

There is almost a grim necessity in the study today of outer space and the solar system.



General science suite now in use in the Cincinnati junior high schools includes the following equipment: 1. teacher's desk, 2. demonstration table, 3. apparatus cart, 4. tables for two students each, 5. steel file cabinet, 6. work table, 7. case assemblies, 8. chalkboard, 9. corkboard, 10. wall tables, 11. pupil chairs, 12. teacher's chair, 13. wall tables, 14. bookcases, 15. sinks, 16. demonstration table sink, 17. map rail, 18. adjustable stools. Preparation room is at the left of the main classroom area.

across the back of the room, as well as between the pillars at the window side. They are used as work space or to display projects and other materials. The room also has a notebook cabinet, bookcases and some wall displays. Stools are provided for the worktables.

We are planning to add a combination cork and pegboard, 16′ in total length and 5′ in height, to the back wall. This will make displays more attractive and will facilitate their mounting.

Displays of student work, charts and clippings from newspapers and magazines can be shown. Students share the responsibility of locating, clipping, mounting and displaying these materials. A corkboard display should be dynamic and frequently changed. A pegboard is useful for mounting all kinds of material. Display boards should have attractive captions, calling student attention to their materials. Corkboard may be used on another side of the room if wall space permits.

Aquariums and terrariums add features of interest for students in science classrooms.

Other Important Items

A sink in the back of the room is a source of water for aquariums and experiments and provides a place for students to clean up after their project work. A stainless steel sink is recommended.

Bookcases hold supplementary materials such as books, booklets, magazines, small charts, insect and mineral collections. These provide reference material for student investigations of science problems.

Dark shades are important for work with films, filmstrips, slides and the microprojector when projecting onto a screen for viewing by the entire class. With many excellent visual aids available this provision becomes more and more of a necessity in the science room.

Plants, animal cages, aquariums and terrariums are kept on the worktables. Students assume the responsibility of setting up and caring for them.

A teacher's desk should be provided, together with a filing cabinet for efficient storage of teaching mate-

Students may contribute to the class work with their displays of special projects which require precision drawing and explanation.

rials that can be kept at hand. Another filing cabinet may be kept in the preparation room.

Student Browsing Area

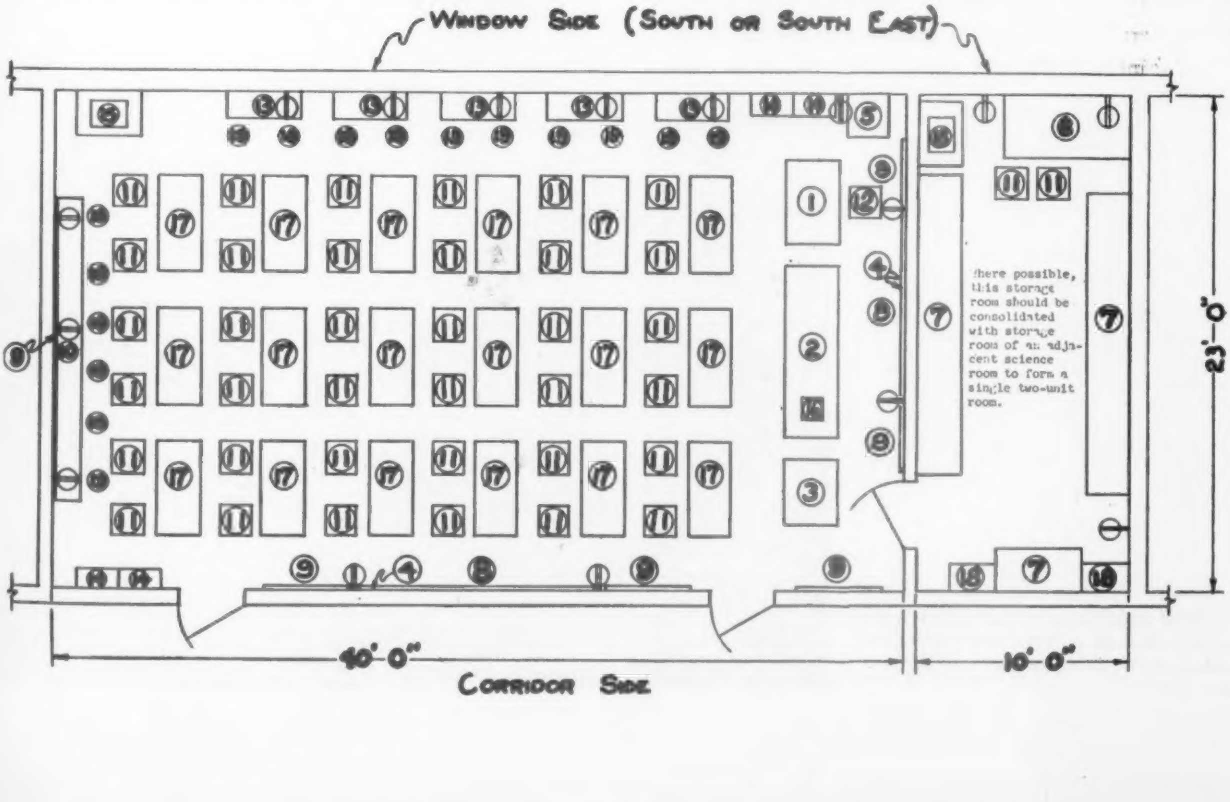
Science teachers like to display the reference materials that students may use in the classroom or borrow overnight. A book table may be provided where students browse and read from a number of sources. An attractive display is arranged with the colorful jackets of new books added to the school library. The books may be borrowed from the library by the teacher on an indefinite loan for use in the classroom reading center.

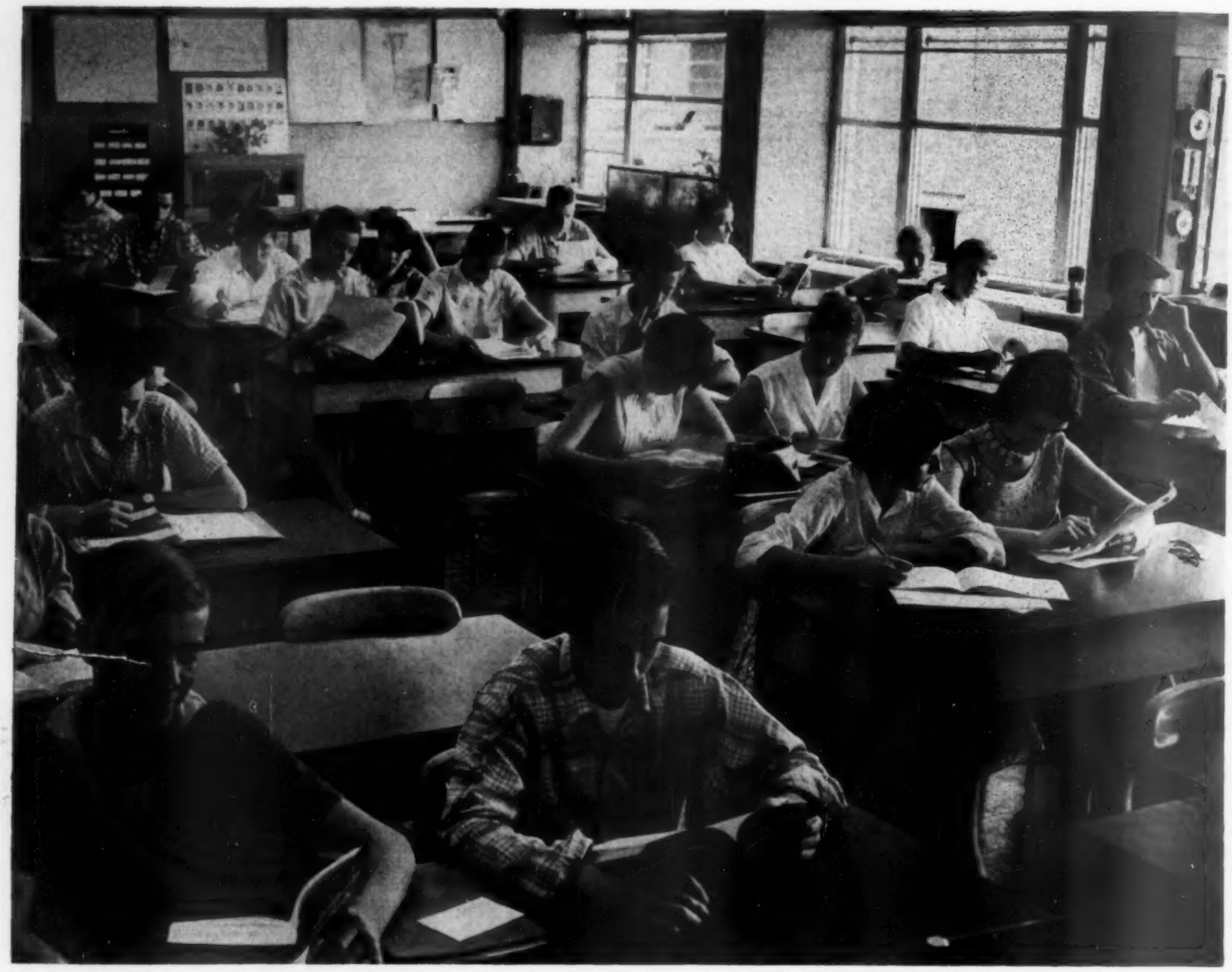
Electrical outlets should be located in several positions on each wall, on the demonstration table and along the worktable space on the window side of the room. They will then be available for the motion picture projector, the microprojector and for the aquarium heater, aerator and pump.

Use of a Preparation Room

The demonstration table provides some storage space in drawers and small compartments, but the bulk

Biology suite similar to those in use in the Cincinnati junior high schools contains the following equipment and facilities: 1. teacher's desk, 2. demonstration table, 3. apparatus cart, 4. map rail, 5. steel file cabinet, 6. work table, 7. two case assemblies, 8. chalkboard, 9. corkboard, 10. wall tables, 11. pupil chairs, 12. straight chair, 13. wall tables, 14. bookcases, 15. sinks, 16. demonstration table sink, 17. tables for two students each, 18. microscopic cabinets, 19. stools.





General science room of the Woodward High School, Cincinnati, designed by architect Charles F. Cellarius, is forty feet long by twenty-three feet.

of the science equipment and supplies is stored in the preparation room. This room is 23′ by 10′, and is shared by teachers in the adjacent science classroom.

Cabinets of different types are available for storing science room supplies. At the Woodward High School two 4-foot full length cabinets, 7 feet high with sliding doors, are used. Two cabinets of the same size with sliding glass door sections above and drawers below

A special book table in the science room enables students to have direct access to reading material related to their current class work.

General science room of the Woodward High School has two 4-foot, full length cabinets with glass doors. The cabinets are seven feet high.

provide additional storage space. Open shelving and several movable carts are also used. The carts are made in our own school shops.

Worktables and chairs provide project space for a few students when classes are in session in the science rooms. A sink adds to the facilities, and a filing cabinet and wall racks for charts complete the preparation room. It is recommended that, when a single preparation room is to be shared by two science teachers, the space should be at least 23′ by 20′.

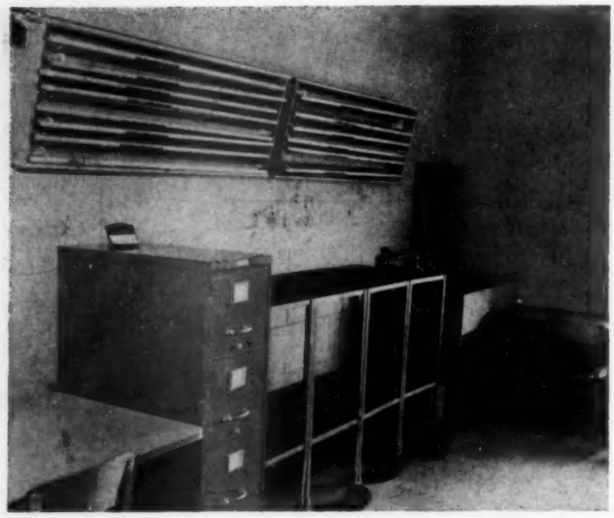
Determining the Equipment

The science equipment and supplies stored in the science suite are usually recommended by the course of study for a given subject. Specific items of equipment are needed as the room facilities are adjusted for teaching the more specialized sciences. Such things as microscopes, larger aquariums, dissecting sets, additional charts are examples.

Besides the purchased equipment and supplies, many pieces of apparatus are made by the students. Homemade or ten-cent store equipment will be found in the science room. Many student projects are donated to the science room to be used by future classes.

If chemistry or physics is to be taught, laboratory tables with sinks, water, gas and electrical outlets, as well as seating for the recitation area, are needed. Extra storage facilities and fume hoods may be required.

Tables may be moved together when a group of four or more students are working together on a special research project. Reports thus prepared are later shared with the rest of the class.



Wall racks for charts, a steel filing cabinet, movable carts and a project sink add to room's efficiency.

A capable science teacher with creative ability and initiative, operating a science classroom with a permissive atmosphere, can do much to adapt his science program to any room which facilitates the necessary learning experiences for his students. All the most expensive equipment in the world in the best possible physical setting cannot substitute for a good science teacher.

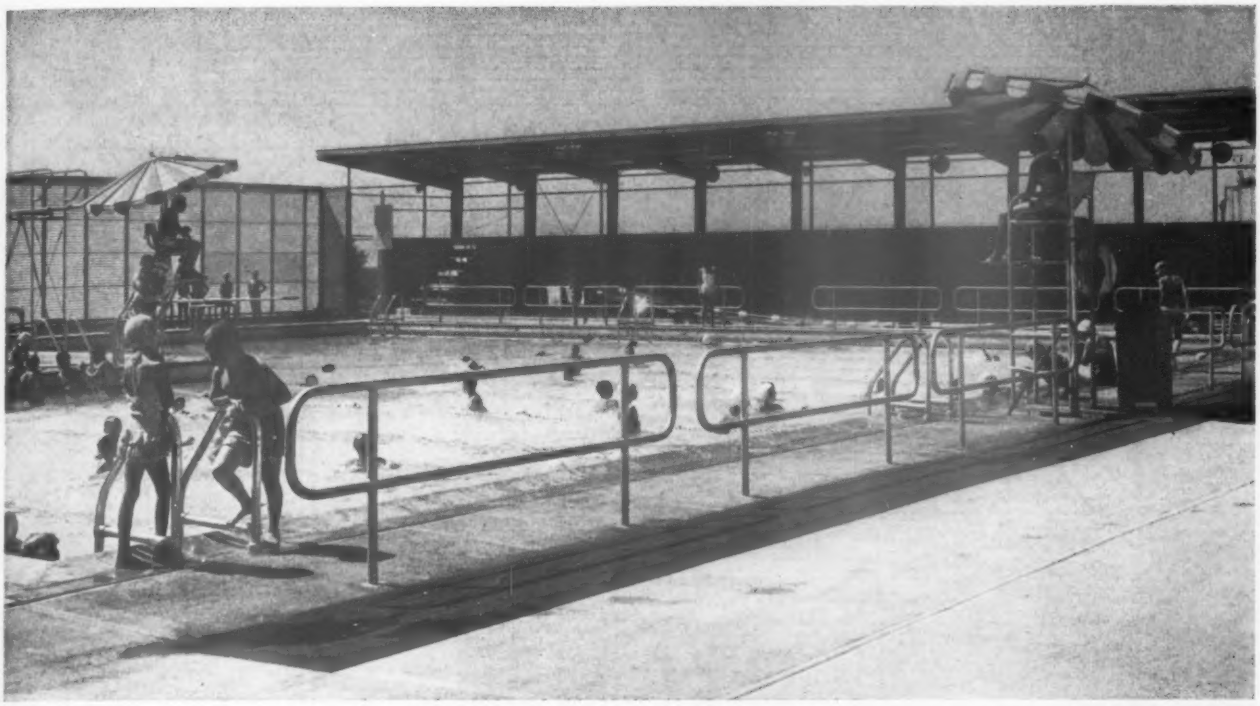
Changes for the Future

After living in and working in the general science classroom of the Woodward High School, we decided on certain minor changes in the room. Floor plans were developed for a general science suite and a biology suite. These plans provide more storage facilities, more corkboard, a different table for biology and indicate a list of basic science equipment for each room. The preparation room between two adjacent science rooms is double the space now in use. Four new junior high schools have been built following these suggested plans.

Are Science Facilities Adequate?

Are our high school science facilities adequate? They are indeed when they provide space for student project activity, for experimentation, for demonstrations, for displays, for a reading center, for group work, for aquariums, for terrariums and animals and have enough storage space for science equipment and supplies. Chalkboard and corkboard, movable furniture with flat top surfaces, good lighting and darkening shades combine to help create a teaching environment for effective science learning activities.

Surrounded by an abundance of visual aids and the proper equipment, students may interpret science study into reality.



The L-shaped elementary school pool is divided into three activity areas. Left foreground is the 3-foot depth for instruction; left background is 12-foot depth for diving; area at right is 4 to 12 feet deep and is used for swimming.

AN ELEMENTARY SCHOOL DISTRICT BUILDS A SWIMMING POOL

by J. WARREN WRIGHT

Wright, Metcalf & Parsons, Architects, Bakersfield, California

The architectural firm of J. Warren Wright and Arthur C. Metcalf was formed in 1945 after the war. Francis Parsons joined the firm in April, 1946. All three are graduates of the School of Architecture, University of Southern California. Author Wright served as a lieutenant in the USNR during World War II, commanding an LST. The firm has won wide recognition for its public buildings.

and FRANK O'NEILL

Superintendent, Rio Bravo School District, California

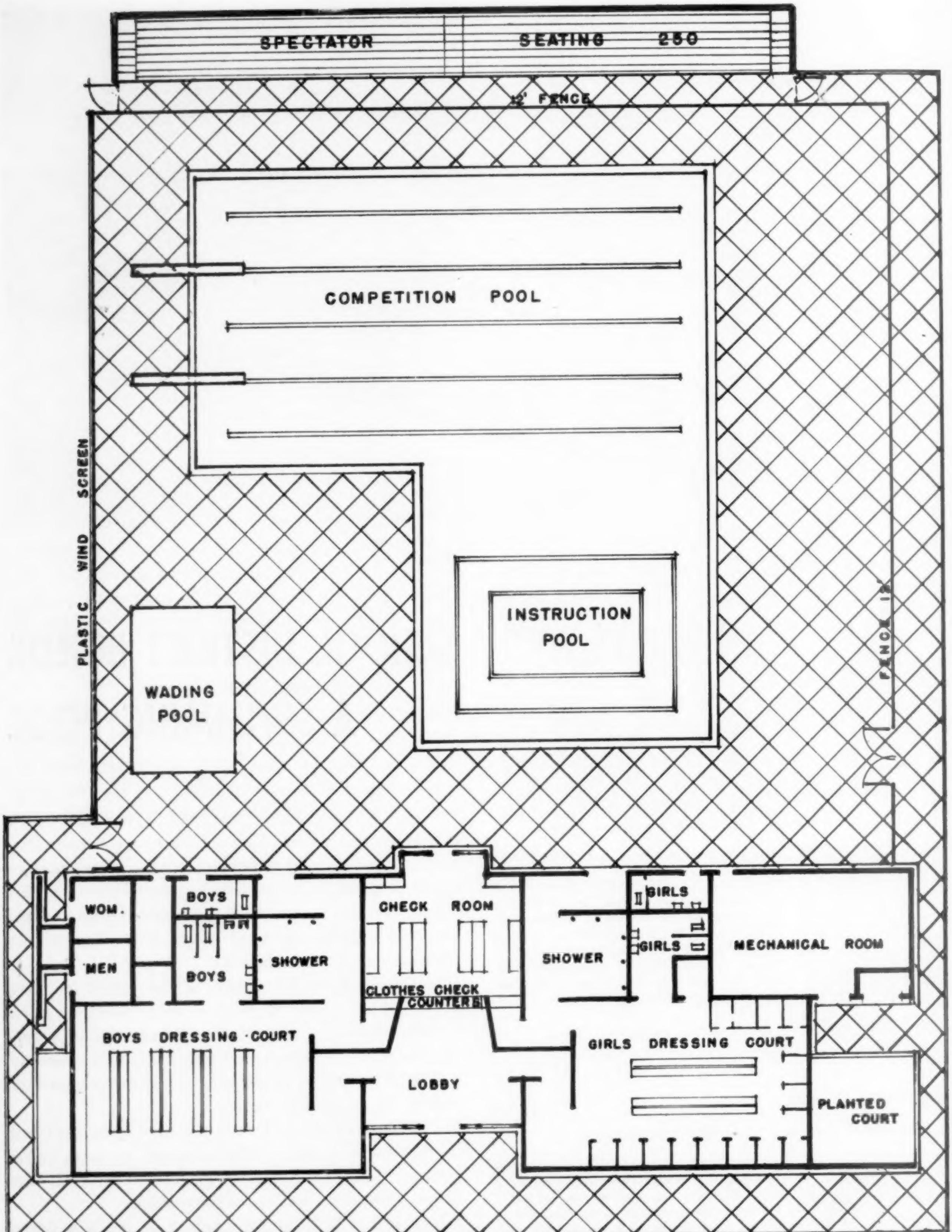
Mr. O'Neill received his A.B. degree and teaching credentials from Santa Barbara State College. He received his administration credentials from Claremont Graduate School. He was a teacher for four years, he has been in administration for the past twelve years. A member of Phi Delta Kappa, Mr. O'Neill has been superintendent of the Rio Bravo Schools since 1947.

THE planning and design processes which culminated in the Rio Bravo Elementary School District's new L-shaped swimming pool are examples of excellent communications between an architect and his client. Communications and the establishment of rapport are difficult aspects of almost any major project which an architect undertakes.

The Rio Bravo Elementary School District had long expressed the desire to have its own swimming pool. Located sixteen miles northwest of Bakersfield, California, in a farming and oil producing area, the community had held discussions on the idea of a swimming pool off and on for almost ten years.

Swimming instruction for the local youngsters had been given at a pool in Shafter, about six miles away. However, the pool there had become so crowded that proper instruction was no longer possible.

Frank O'Neill, superintendent of the Rio Bravo District, firmly believes that the kindergarten to third grade age level is the easiest group to teach and handle in a swimming pool. From the fourth grade on, the individual's fear of the water becomes pronounced. Although some may contest this as theory, superintendent



Floor plan and pool plan of the Rio Bravo Union School District's new swimming pool for elementary students, designed by the firm of Wright, Metcalf and Parsons. Wading pool for the small fry is separated from the deeper waters of the main L-shaped pool. Main lobby leads to the dressing courts for boys and girls and the checking counter. Shower rooms lead directly to the pool area.

O'Neill's experience over the past years has convinced us that he is right.

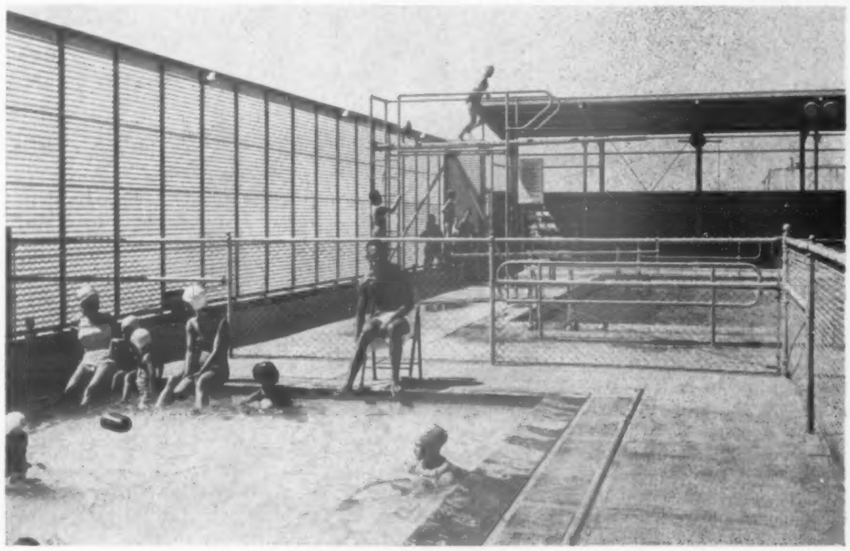
Community Endorses the Pool

Mr. O'Neill, at the request of the Board of Trustees, called a general public meeting. Several swimming pool authorities were invited to speak, and submit to a question and answer session. The meeting was well attended. All phases of pool cost, use and value were discussed. After hearing the facts, the community heartily endorsed the motion for a new pool of their own.

With this clear mandate, the Board of Trustees asked superintendent O'Neill to call upon the services of our architectural firm—Wright, Metcalf & Parsons of Bakersfield, California. We had previously completed other projects for the district, and a fine working relationship had been established.

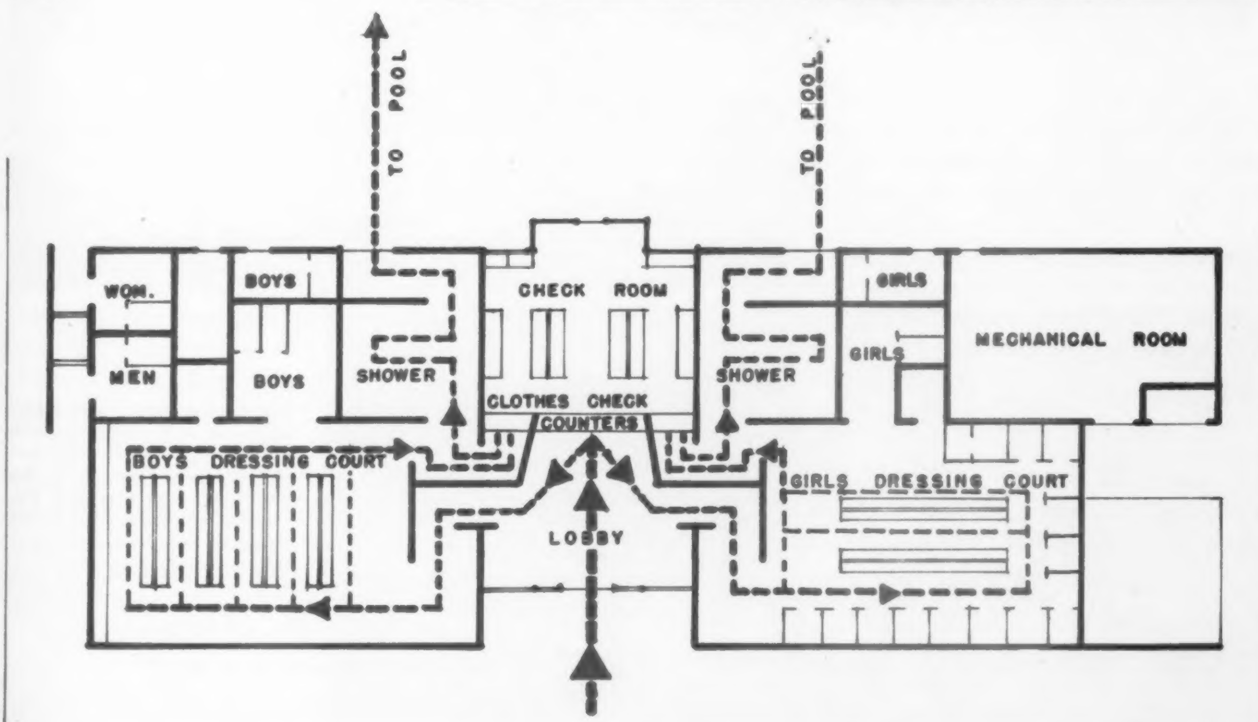
Data Are Gathered and Analyzed

In early discussions with the board, it was determined that data on similar swimming pools throughout the southern San Joaquin Valley should be gathered and analyzed. A comprehensive questionnaire was developed. Subjects for analysis included: arrangement of dressing rooms, type of lockers, handling of clothing and valuables. How rough should the pool decks be for safety? Was it better to have individual or gang showers? The arrangement of the central offices was among the subjects studied. Also of interest were the possible placement of guards, types of building materials used,



The wading pool has proved popular for the under-five set. Close supervision is maintained at all times. In three years the pool has never had a serious accident.

Circulation floor plan (below) for the pool was carefully worked out to insure the flow of students from the lobby to the checking counter, then to the dressing courts to the shower rooms and out to the pool.



filtration systems, pool depth and shape, and public address systems.

Following analysis of the data, the Board of Trustees, the superintendent and members of the architects' firm made several field trips for on-the-spot studies of special features under consideration in the Rio Bravo pool design. The trustees and school superintendent met regularly with the architects in planning sessions.

Meetings and Discussions

We discussed at length the data gathered from the field trips and the mail survey. During these sessions an avenue of two-way communications was developed that was to pay real dividends for all concerned with the project. From these meetings we began to prepare our preliminary schemes and drawings. The discussion sessions served as a point of departure for further development in preparation of the plans.

The time spent in regular meetings, planning and drawing the preliminary plans consumed better than one year. This period of development was most important. Just how important is shown by the fact that, when the Division of School Planning of the California State Department of Education was called upon to review the plans, only minor changes were indicated.

The swimming pool was one year in the construction stage, and cost $189,000. Gunite construction with a cold expansion joint was used. For our purposes, gunite offered the most flexible type of construction.

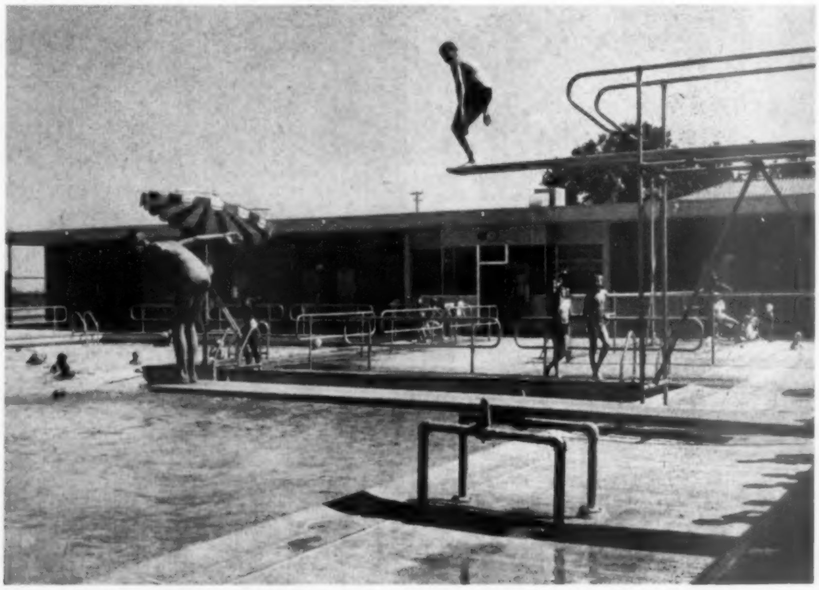
Unusual Features and Design

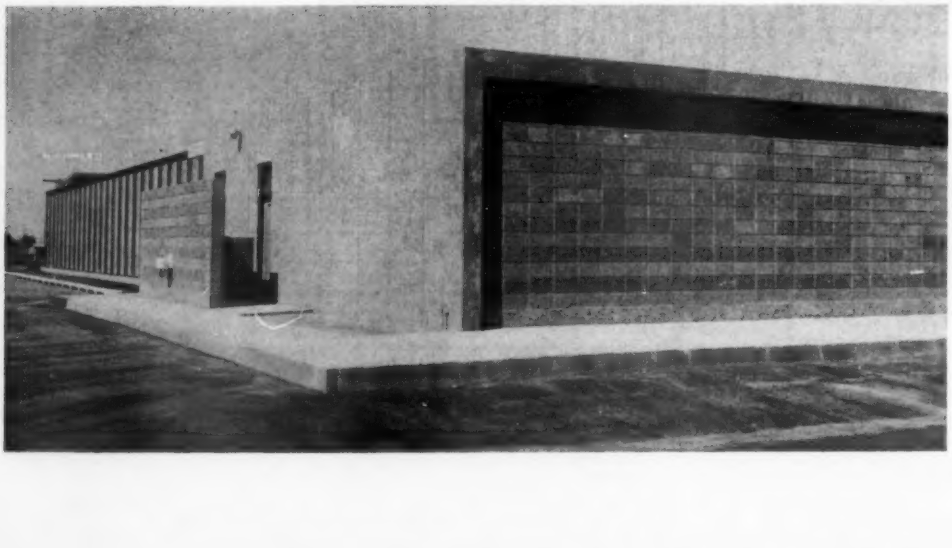
Incorporated in the pool design is a new kind of scum gutter. Youngsters cannot stand on it for diving, nor can they catch an arm, knee or leg in the recess. This is one example of the new features developed especially for this pool as a result of the extensive survey to discover deficiencies in existing pools.

A roof over the dressing room areas was omitted (permissible in California) to let the golden sunshine pour in. To date there has not been one case of athlete's foot at the pool. An attracting feature for other schools considering a pool is the clean fresh smell of the Rio Bravo Pool dressing rooms. None of the usual odors that go with a damp closed-in dressing room are apparent here.

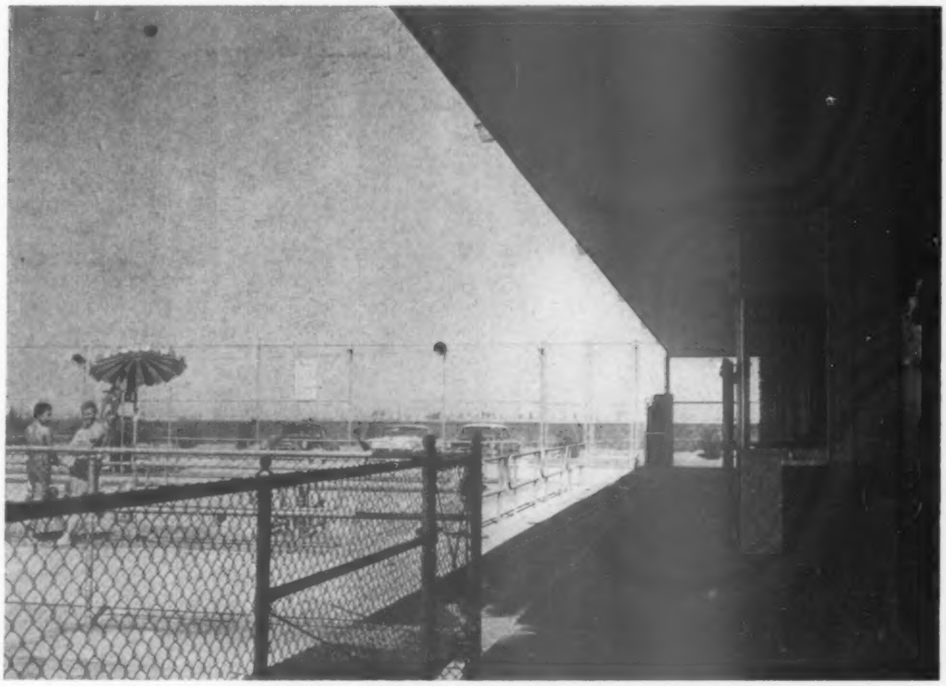
The pool is L-shaped, which design afforded sub-

Designed primarily for swimming instruction with recreation as a secondary benefit, the Rio Bravo pool is in constant use. The diving area is roped off for safety. The pool deck is extra rough to prevent slipping. The central administration office is located in the center of the building for dual use. Dressing rooms do not have roofs and let in the California sunshine.

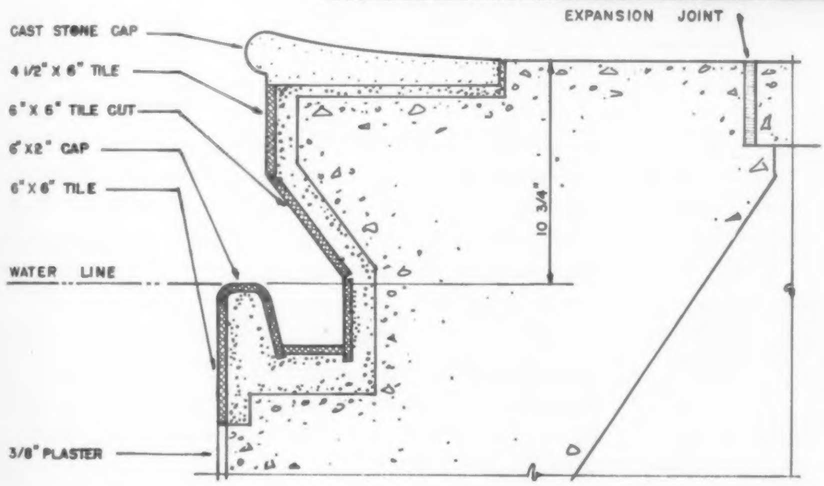




The trustees and school superintendent met regularly with the architect in planning sessions while the new swimming pool was being designed. This cooperation resulted in a pool designed to meet the needs of the community it serves.



The long clean lines of the main structure reflect the overall simplicity of design. Safety features were stressed.



A new kind of scum gutter was incorporated into the pool. Youngsters cannot stand on it for diving, nor catch arms or legs in the recess.

stantial savings. It is 25 yards east to west and 25 meters north to south. It has five lanes, and is 42 feet wide. Other features include a wading pool for the small fry, and a public address system. A covered bleacher area with a seating capacity of 250 was built at the north end of the pool. This provides a place out of the sun where parents may sit and watch their youngsters. It has also made it possible for the Rio Bravo Pool to become the locale for county-wide competitive swimming meets.

Our preliminary research helped us establish definite ideas concerning pool deficiencies. Upon overcoming these, we developed the overall concept of the Rio Bravo Pool. In several cases features were considered that varied from the accepted design for swimming pools.

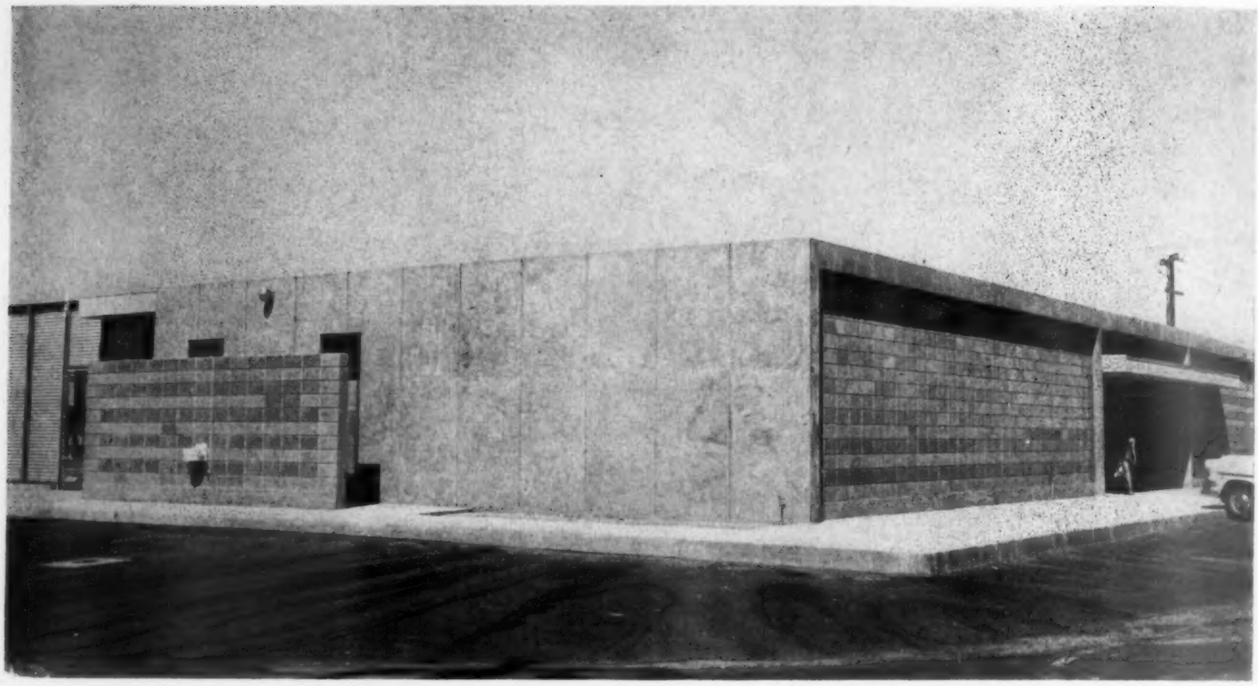
Safe and Functional Pool

The Rio Bravo Pool is not a severely simple structure, neither is it elaborate. The board's policy was to provide everything actually needed to make the pool safe and functional. For example, the primary consideration in lighting the pool was safety, not to enhance its beauty.

From our studies, we plotted charts to determine the placement of personnel. The pool area has two tower lifeguards, two roving guards and an overall supervisor. A locker guard and an admittance attendant complete the staff. This close supervision of the youngsters, made possible by good design, has paid off. There has not been a single serious accident since the pool has been in use.

The main premise of the Board of Trustees was to establish a pool for educational purposes with recreation as a secondary benefit. The objective was to teach as many people how to swim as was possible. Survival swimming first!

This thinking is reflected in the design of the pool. About two-thirds of the pool area is 4 to 12 feet in depth for competitive swimming and diving. When the



The Rio Bravo Elementary School swimming pool structure is of contemporary design. Detailed study was made of existing pools in the Southern San Joaquin Valley before the actual planning of the pool was begun.

pool is not being used for competitive swimming, the diving area is roped off. One-third of the pool is 3 feet deep, and is used for instruction purposes. The L-shape permits these varied uses, and afforded substantial savings in construction costs.

A small portion of the deck along the 3-foot side is radiantly heated. This provides a year round area for artificial respiration and other types of instruction.

Real Understanding Developed

One reason the Rio Bravo Elementary School District has been pleased with its swimming pool is the discussion and planning sessions that were held. Every problem was studied by the architects and educators together, and a real understanding developed. Each knew what to expect. At the completion of the project, there was no misunderstanding or ill feeling over the results achieved.

Rio Bravo is considered by its community as a fine swimming pool—but we consider it to be more than that. For us it is an excellent example of good communications and rapport—two factors which many architects discover are the most difficult aspects of their design projects.

MINIMUM LIBRARY FACILITIES FOR THE K-SIX SCHOOL

by RHETA A. CLARK

School Library Consultant, Connecticut State Department of Education

A graduate of Connecticut College, Miss Clark later received her M.A. degree from Teachers College and her B.S. from the School of Library Service, Columbia University. She has taught summer and extension courses in this field and has written "Elementary and Secondary School Libraries: Criteria for Service, Personnel, Rooms, Budget and Book Selection," published by the Connecticut State Department of Education. Miss Clark has also taught in the public schools of Newington and Wallingford, Connecticut.

OF primary importance in determining facilities and areas for the modern elementary school library is the need for the school administrator, the architect and the school librarian to plan together. The kind of library which a particular school should have will depend upon the instructional methods and educational learnings which are to be offered.

What is the prevailing philosophy of the school? How will the library resources and services affect the growth of the children? Is this program for all the pupils? Are all children being prepared for reading readiness and being taught to improve their reading? Do teachers and parents want their children to learn by doing, to learn to be resourceful, work independently and assume group responsibility? Do they want the brighter ones to be able to delve successfully into the complexities of their problems? Are the library services to supplement all areas of the curriculum? To what degree does the library teacher work with teachers and parents on children's individual problems?

The answers of parents and teachers to these and similar questions will determine in large measure the school library facilities and areas which will be most useful to the total school program. For such affirmative kinds of learnings, a *minimum* school library program for a 7 to 14 room school will be presented here. These recommendations are based on an average class size of 25 to 30 pupils.

Location and Size

The library should be centrally located within the educational areas of the school and away from noisy

Book display dominates foyer of Dominick F. Burns School, Hartford, Connecticut. Architects are Carl J. Malmfeldt and Associates.

Shelves are used for display as well as books in reading room of the Mary M. Hooker School, Hartford, Conn. Carl J. Malmfeldt and Assoc. are the architects.

sections, such as the play area, the gymnasium, music room and cafeteria. It is important to place the library in a part of the school building where expansion is possible, not for example next to a stairway.

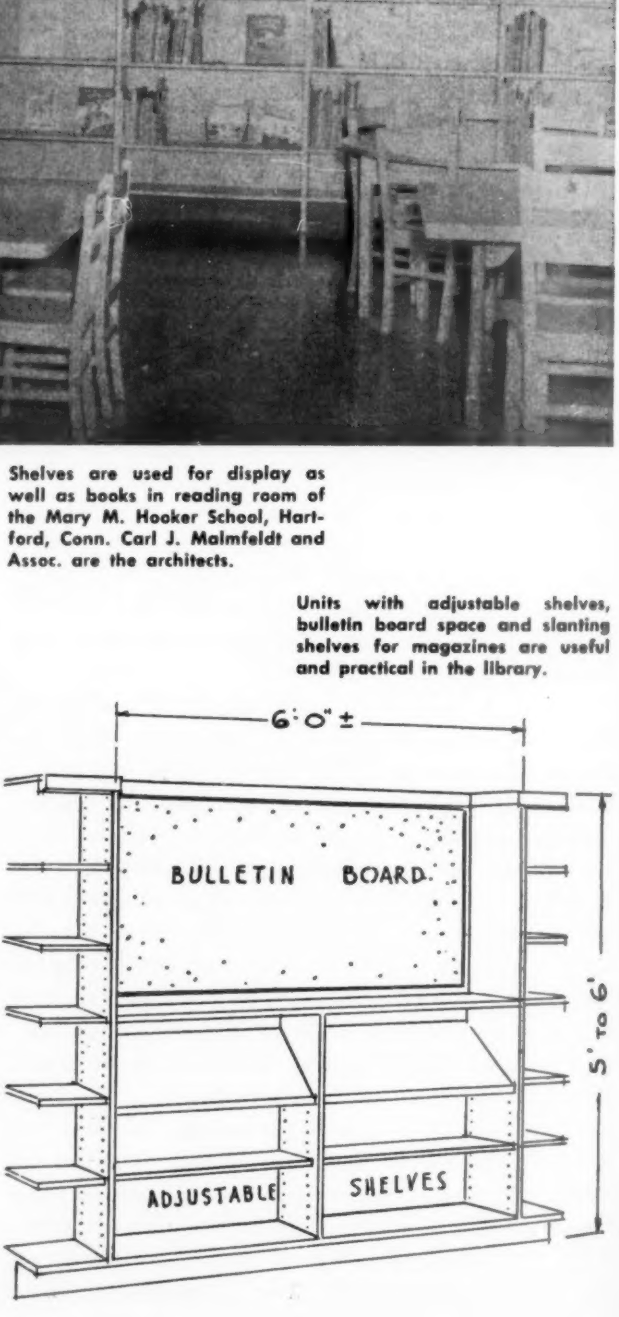
The maximum area should be not less than a classroom and a half, preferably 1,350 square feet. This will allow 1,000 square feet for the reading room and 350 feet for work and storage areas. Rooms which are 32 feet in width lend themselves to an uncrowded appearance in the arrangement of library furniture. This size permits a reading area of 25 square feet per pupil for 40 pupils. Through flexibility of scheduling and the moving of furniture, many different groupings can be arranged and the library facilities will be available to both scheduled and unscheduled groups during the day.

The atmosphere of the reading room should convey an invitation for reading and study. By the varied use of color on the walls, appropriate floor covering, draperies, soft but effective lighting, blonde furniture of suitable construction, blending formica-top tables, and the discreet use of glass, the room can be made attractive at a surprisingly moderate cost.

The Learning Materials

The minimum book collection for an elementary school library having seven or more classrooms is 2,500

Units with adjustable shelves, bulletin board space and slanting shelves for magazines are useful and practical in the library.



carefully selected volumes. These are to be pertinent to the curriculum and meet the reading interests and abilities of pupils. For the school having more than 300 pupils, eight to ten books per pupil should be provided. To the book collection add a minimum of 400 pictures and pamphlets, 15 magazines, 200 recordings, 25 to 50 tapes and 400 filmstrips.

Reading Room and Furniture

The reading room provides space for children as well as for book and non-book materials. Cushions on the floor will accommodate a story-telling class, tables and chairs will be used by the class which comes to do reference work, receive library instruction or just read. In addition, there should be space in an informal area for eight, twelve or more pupils who have come from classrooms to explore ideas, to find the answers to questions and to read.

Library furniture should be sturdy and conducive to maintaining good posture habits. Matching or blending furniture adds to the attractiveness of the reading room.

Standard library equipment may be purchased from library supply houses. When furniture is purchased from other firms, request standard dimensions.

A reading room of the size recorded here should have six tables. Two of these are rectangular, 26″ in height, 30″ in width and 5′ in length. Two are round, 26″ in height, 4′ in diameter; and two are trapezoidal, 26″ in height, to be used in sections or as a whole unit. The chairs, equipped with noiseless gliders, should measure 16″ in height.

One low table, measuring 24″ in height, 30″ in width and 4′ in length, will be needed for the primary children. Four chairs, 14″ high, and a round "listening" table similar to one of those mentioned above, will be useful for listening to the record machine with earphones.

For the normal arrangement of furniture, space may be utilized in the following way. For aisle space between tables (no chairs in aisle) allow a 3′ minimum; aisle space between tables (chairs in aisle) a 5′ minimum; aisle space between table ends and shelving, same as between tables. Tables should be positioned so that as few pupils as possible will have to face the windows.

For the informal area, colored wire and plastic chairs, sectional divans seating two or three children, and six low stools, all of which can be arranged in one section of the room or around the periphery of the tables and chairs, add to the pleasantness.

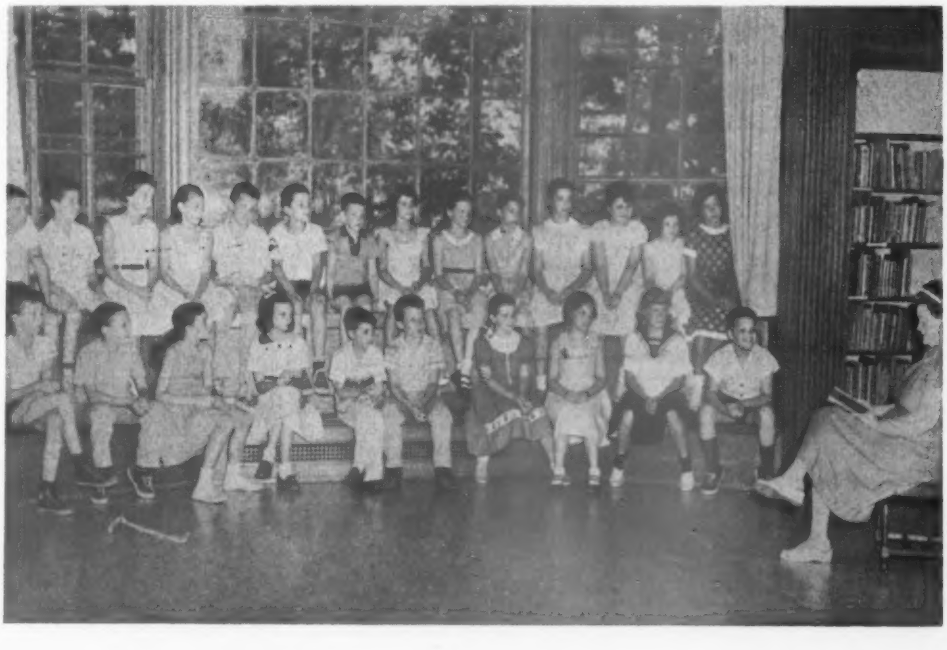
Informal periods in the library require enough free space in one corner or at one side of the room so that a story-telling session can be quickly arranged. For the younger children, this can be accomplished by taking floor cushions from the cupboard or from underneath the primary bulletin board. For an older group the setting of an informal session may be prepared by pushing the necessary furniture into a semi-circle.

The charging desk should command the room and be located near the most frequently used entrance. Fire regulations usually require two means of egress. The desk should, for convenience, be close to the work and storage areas.

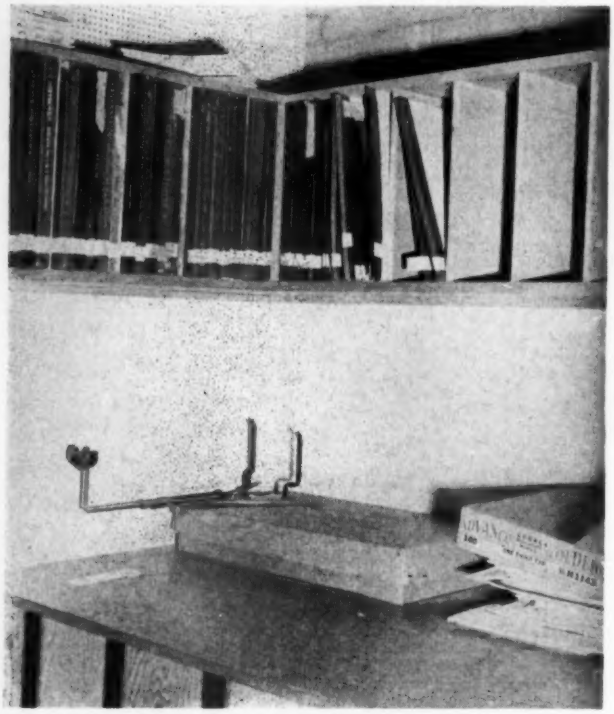
Nearby should be the library teacher's desk. This is particularly expedient if pupils take a major responsibility in charging and discharging materials. Two small desks are usually preferable to one large charging desk. They may measure 5′ in length, 24″ or 30″ in width, and 32½″ in sitting height.

Additional Library Equipment

To promote efficient library service, the telephone



Story hour is a pleasant time in the library of the Riverside School, Greenwich, Conn. School was designed by William F. Dominick, architect of New York.



Records are stored in high wall shelves in workroom of the North Street School, Greenwich. Architects of the school are Sherwood, Mills and Smith.

Fireplace adds to the decor of the library reading room in the Dominick F. Burns School in Hartford.

and other library equipment such as the card catalog, the atlas stand, the vertical file and the book truck should be reasonably close to the charging desk.

The card catalog may be purchased in sections of five drawers each. A 15-drawer cabinet, with large label holders and rods for each drawer, is recommended. Plan to allow five cards, 3" by 5", for each book and 1,000 cards per drawer.

Floor Magazine Rack

The floor model magazine rack, with six compartments, makes possible a compact and interesting display of current magazines. A vertical file cabinet will hold the bulletins, pamphlets, small maps, pictures and charts. A three-drawer cabinet, legal size, equipped with a flexifile for each drawer, will be satisfactory.

The atlas stand should have a sloping top with three or four sliding shelves underneath. Two book trucks are desirable, one for the workroom and the other for the reading room. In turn, they can be used to transport books on loan to classrooms.

Shelving for Learning Materials

To provide space for 2,500 books, approximately 270 running feet of shelving are required—225 feet for the regular collection and 45 feet for picture books. In shelving books, eight books to the foot, and for picture books, fifteen books to the foot are considered satisfactory ratios.

Shelving should be adjustable with the bottom shelf tilted so that titles will be easy to read. The overall height of the shelving should not exceed 5'6". It is important that youngsters be able to read the titles on the top shelf and be able to reach these books, without help.

The specifications listed below are considered standard. If shelving is built in, it is important that these dimensions be met:

Dimensions for Shelving

Length of shelves between uprights	3 feet
Standard depth of shelves	8 inches
Thickness (hardwood)	¾ to $^{13}/_{16}$ inches
Height of the base of case	4 to 6 inches
Total height of case	5 feet, 6 inches
Space between shelves (This is an average. Adjustable shelves are needed for over-sized books.)	10 inches

Apportion approximately two-sevenths of the shelving for picture books. Use the bottom two-thirds of a section and divide the lower part into vertical compartments which measure 7" in width and preferably 15" in height and depth. Above these compartments place one or two slanting shelves for display. In addition there should be one section of shelving reserved for the teachers' professional books.

Display Area Recommendations

Display areas should meet the eye levels of the primary and intermediate groups respectively, so that each group may view its own special exhibits. For the primary children, a bulletin board can be placed above the cupboard where the story-telling cushions are kept. This cupboard might well project into the room by 4 to 6 inches to permit the cushions to lie flat on the shelves.

Bulletin boards for the older children may consist of cork board placed behind the shelving in the upper

part of two sections. Under this bulletin board space, place an adjustable level shelf, a slanting shelf and another level shelf.

Large pictures are displayed on the picture rail or groove at the top of the bookcases. Place peg and tack-board in suitable locations within the limits of the room.

In addition to the shelving space allotted for exhibit and bulletin board purposes within the library, a recessed exhibit case in the corridor, just outside the library, is useful. This case should open from the work-room for convenience. The dimensions may be 6′ in length, 3′ in height, 15 to 24″ in depth. The exhibit case should be set at child-eye level, covered with one sheet of glass rather than two doors, and should have bright lighting from within the case.

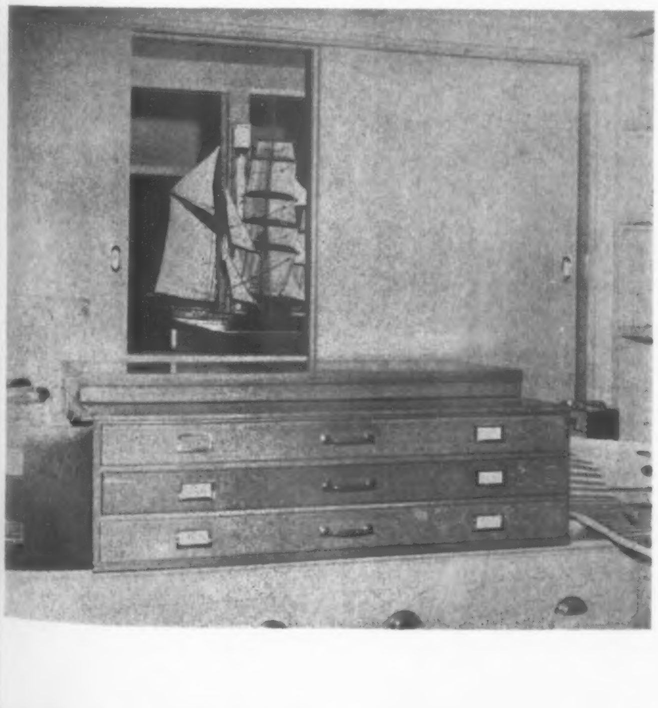
Lighting and Ventilation

To provide sufficient natural lighting, windows are recommended above the bookcases on the exterior wall, and on two walls when possible. Ribbon type windows permit maximum shelving area. Casement windows should not be used because they are difficult to operate, especially for ventilating purposes. On one side of the room construct a picture window or glass alcove, six or eight feet in width, out of which primary children as well as the older ones may view the outdoors. Natural illumination by plastic domes or similar method has been found satisfactory for supplementary lighting in dark areas.

Venetian blinds or other shading devices will protect pupils' eyes from the bright sunlight.

For artificial lighting, indirect ceiling lights, with or without the usual shielding, will give ample light, depending upon fixture design. The lighting should allow 20 to 30 foot-candles of light on working planes,

This is back view of display case of the Riverside School library.



Practical steel shelving is used in library storage area in the Dominick F. Burns School. Shelves can be adjusted to any size.

free from glare. Luminous ceilings are a source of even lighting, but are expensive to install. Inside lights should be on a separate switch. Place an electric outlet on every wall.

To insure adequate lighting for shelves, tables and the charging desk, it is best to consult an illuminating engineer. Ventilation in the library should be supplemented by outside air, and fenestration that provides 100 percent ventilation is recommended.

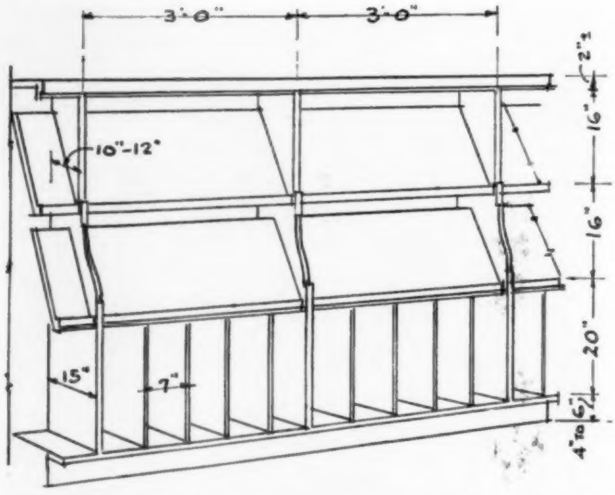
The Finishing Touches

Floor coverings may be of linoleum, rubber tile or some sound-deadening material. To a reasonable degree the color tone should have a light reflecting quality.

Flat finish paints in varied light, attractive colors are desirable. No gloss finishes should be used on either walls or furnishings. Grayed tints of high reflective value are recommended for general use. The trim may be of a somewhat lower reflective value. Illuminating engineers will give the best recommendations regarding choice of paint and colors.

Workroom Dimensions

The workroom should have at least 350 square feet of area. Space and equipment are needed for processing books—storing books while they are being processed, pasting book pockets and mending books—typing cata-



Sloping shelving will accommodate library's picture books.

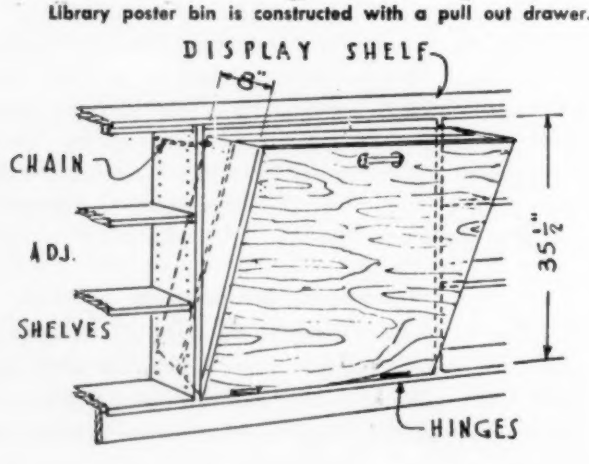
log cards and shelving new books until they are ready for use. In addition, magazines over a three-year period (especially those indexed in the *Subject Index to Children's Magazines*), special collections, scale models, dolls, dioramas, replicas, etc. are stored in the workroom.

Sufficient space makes it possible for the library teacher to organize materials quickly and effectively, while cramped quarters only handicap his efficiency and reduce his output. In the workroom partition there should be at least one glass panel which is in line of vision with the school librarian's desk.

The layout of the workroom is similar in design to a modern kitchen, having a sink with hot and cold water, a counter with stainless steel, formica or linoleum top, and cupboards above and below the counter (depth 18" to 24" for lower cupboards). On the long side of the wall, there should be adjustable storage shelves, measuring 6' 10" in overall height and 12" in depth.

Equip six feet of the shelving with inserts for records. It is particularly important to keep 33 rpm records upright and tightly together to prevent warping. For the filmstrips, purchase a five-drawer steel cabinet with sturdy extension arms, approximately 19" in width and 16" in depth.

Library poster bin is constructed with a pull out drawer.



A recessed poster bin provides storage for large pictures and posters. Its dimensions are 35½" high, 8" deep and 36" wide; allow 12½" for a chain, fastened on the left. The bin should have two or three compartments and the front of it is hinged onto the base. It is important that the bin be made of plywood or other light-weight substance. Pegboard fronts will provide ventilation.

Additional equipment includes a bulletin board for notices for pupil library assistants; a vertical file (letter size); four chairs; typewriter table on wheels and a typewriter, elite type with a card-holding attachment; and space for the book truck and a worktable 3' by 6'.

An electric outlet is needed at counter height and the lights should be on a separate switch.

In some school systems central processing is performed from a separate building and audio-visual materials are administered by another department. In such

Office of the library in the North Street School, Greenwich, has a glass window panel which facilitates control.

cases the area of the library workroom could be reduced to 225 square feet, with the additional footage added to the reading room.

If the school librarian administers all of the audiovisual materials for his particular school, 125 square feet should be deleted from the workroom for an adjoining area with a locked door. This will be the machine and repair room with a work bench for splicing film and locked cabinets for the machines. These include a 16 mm. film projector with a 500-watt bulb, a recording and tape machine, an opaque projector, a slide projector, a filmstrip projector and seven phonographs.

Laboratory and Larger School Libraries

Where one or more school librarians serve more

Trapezoidal tables are used in the reading room of the North Street School. Luminous ceiling provides quality lighting.

than fourteen classroom teachers, the size of the reading room should be increased from the figures quoted above to seat the classes which will be using the room at any one time. For a laboratory school or one where the library materials are used intensively, the area should be four or five times greater.

Counter-height shelving, vertical files and other furniture may divide one section of the library from another. For schools in those communities which can afford more than the minimum facilities (with the belief that the aggregate gain in learning experiences and knowledge is greater), not only would the area for library quarters be increased, but also the spaces for personnel, learning materials and equipment.

Professional Library Room

In larger schools, a separate conference room, 120 to 144 square feet in area, for use by teachers and parents, is desirable. Here would be kept recent professional books and magazines, curricular studies and textbooks acquired for review. This room is equipped with adjustable book shelving, 6′ 4″ in height, a bulletin board, a table 3′ by 6′, and six or more chairs. The lighting fixtures should be on a separate switch. The room

Fireplace wall of brick and stone enhances reading room of the library of the Clyde L. Lyon Elementary School, Glenview, Illinois. Architects are Perkins and Will of Chicago.

Hedrich-Blessing Studio

Catalog file in North Street School library has a 20-drawer cabinet.

could double in use as a preview area for audio-visual materials. Otherwise, a separate preview room would be provided.

Extras to Consider

Whether in the small or large school, there are many "extras" which can be added to assist learning and to make the school library program more meaningful. A foyer to the library, with appropriate displays, is a pleasant introduction and, usually, has a quieting influence upon those entering the library. For the primary group, a sloping top table, single or double style, with a bench or chairs, is desirable within the library. And all the children will enjoy a window seat for reading and story hours, and a fireplace.

If there is a glass panel between the reading room and the corridor, pottery and floral arrangements, placed on a horizontal shelf, will add visual appeal. The panel will also transmit additional light and give the library an attractive appearance. A floor display case and a bookcase with glass doors for rare and special volumes are always valuable assets in a library.

A Starting Point

If the elementary school library is to fulfill its function within the scope of the overall school program, careful planning of needed facilities is essential. It is hoped that the recommendations for minimum facilities presented here will be a starting point toward better and better libraries for elementary schools.

Children will come to know and love books and reading when they feel that they are welcome in the library.

FACILITATING THE HOMEMAKING PROGRAM

by RUTH STOVALL

Supervisor, Home Economics Education, Alabama State Department of Education

Miss Stovall has a B.S. degree from Alabama College and an M.S. from Cornell University. She taught vocational home economics in Alabama for six years and was a district supervisor of home economics education in 12 counties in southwest Alabama. Miss Stovall was the recipient of the Distinguished Service Award from the University of Alabama in 1956.

PLANNING and equipping areas for homemaking concerns school administrators, teachers, architects and parents alike, because today's homemaking department is a home within a school. A broad new educational development recognizes the responsibility of the school in improving one of the major aspects of living—home and family life.

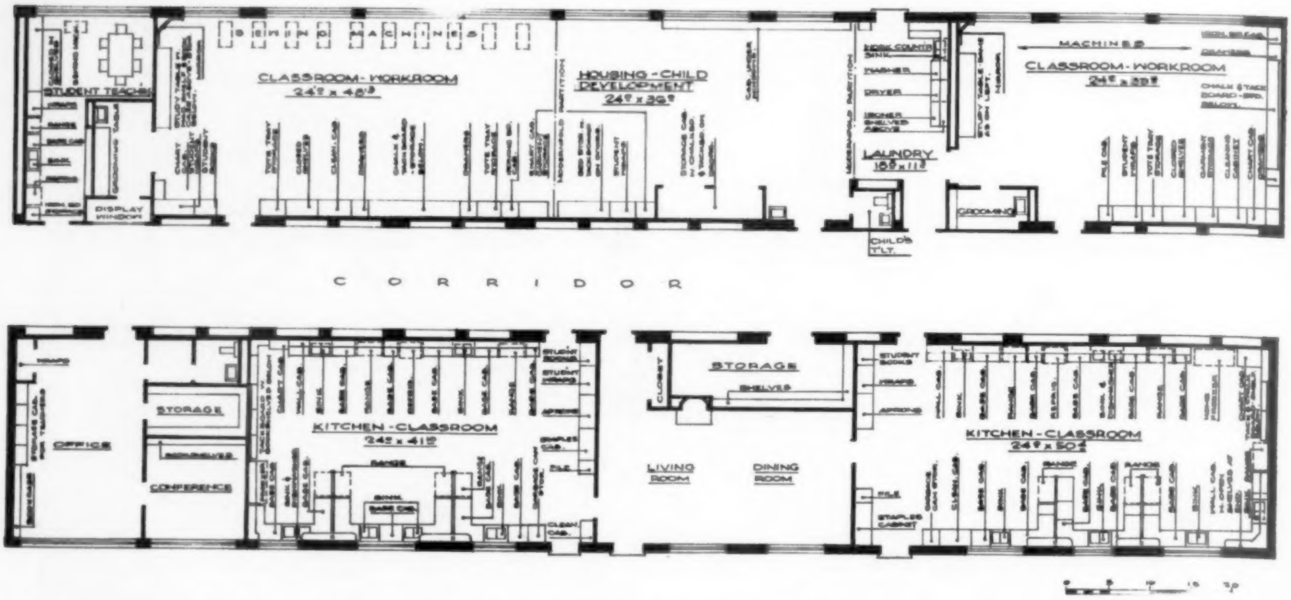
The homemaking program supplements the efforts of the home in providing learning experiences which will improve the quality of family life and strengthen the family as a primary group in society. The program includes class experiences at school and supervised experiences at home in all aspects of homemaking, including child growth and development, family relationships, consumer buying, clothing, foods, health, home nursing, home management, related art, housing, house furnishings and equipment.

Modern homemaking departments are planned and equipped to teach the different aspects of homemaking in terms of present-day family living for homemakers of tomorrow and adult homemakers. The curriculum is based on the needs and concerns of families represented in the homemaking classes. Actual experiences with problems are provided on both an individual and group basis. Living in a family is a group experience and homemaking classes make use of group activities to teach cooperative planning and action in solving common problems. Sufficient space and equipment is needed for both individual and group learning.

For Family Life Today

In teaching homemaking today, it is recognized that rapid changes are taking place in family living. It is important that these changes be reflected in the homemaking curriculum, space and equipment. Family housing ranges from apartments, farm homes, large rambling houses, small compact homes, to trailers for people on the move. It has become necessary for homemaking departments to provide space, equipment and experiences through which pupils may learn how to provide comfort, convenience, attractiveness and a pleasant atmosphere, applicable to any home situation.

A growing number of homemakers are employed outside the home on either a full or a part-time basis. Quick meals and informal meal service such as outdoor



These rooms are used by four teachers on a rotation plan at the Tuscaloosa High School, Alabama. The laundry provides a service center for the department and is accessible to all rooms. It can be combined with the housing-child development room for laundry lessons.

The housing-child development room and the classroom-workroom may be combined into one room for large group meetings. A workroom for student teachers has been provided, since this is a student-teaching center. There is an outside entrance to the living room.

cooking and TV snacks are becoming a part of the family's way of life. Home freezers, heat controlled electric kitchen utensils, pressure saucepans, dishwashers and other improved kitchen appliances are viewed as important to the efficient operation of homes as means of saving time and effort.

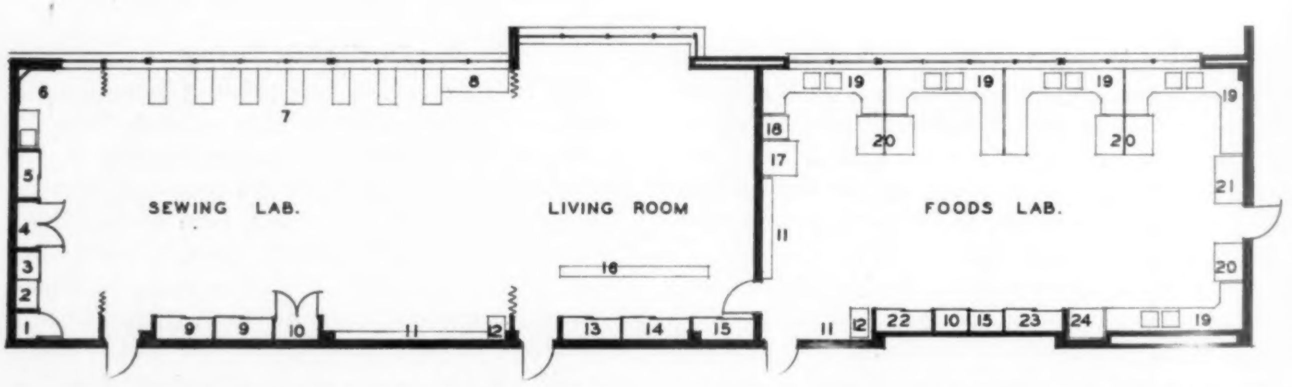
Equipment should be provided in the homemaking department to enable the class work to parallel family life situations in the community. The trend toward short cuts in clothing construction has brought about the need for more sewing machines for class work, since more machine stitching and less hand stitching is used. Some sewing machines with automatic features are desirable for class instruction.

The "do-it-yourself" movement in families points the way for equipment and instruction in home repair and redecorating, as well as practical crafts.

The Family Is a Consuming Unit

The family of today is a consuming unit rather than a unit for producing goods and services. Equipment and experiences should be provided to help pupils develop competencies as consumers. Managing a home within the family income requires businesslike methods and careful buying.

The homemaking department should be planned and equipped for experimentation with different kinds of equipment and furnishings, trying out different working heights, working surfaces and floor treatment, in order to determine the advantages and disadvantages



One or two-teacher department of the Enterprise High School has modernfold doors to make possible the combination of the living-dining room and the classroom. The areas and equipment provided in this space designed by Bond and Bond, architects are: 1. ironing storage, 2. home care of sick storage, 3. child development storage, 4. bed storage, 5. fitting storage, 6. fitting mirror, 7. sewing machines, 8. magazine storage, 9. sewing box storage, 10. chart storage, 11. tack and chalkboards, 12. file, 13. coats, 14. general storage, 15. cleaning storage, 16. room divider, 17. Bendix, 18. water heater, 19. cabinets and sinks, 20. range, 21. deep freeze, 22. apron storage, 23. staples storage, 24. refrigerator. The space can be extended for many purposes.

Hospitality center of the Thomasville High School in Alabama is part of the living-dining area. Draw drapes add contrast to the texture of the block walls.

A wall oven is a feature of the modern kitchen facilities of the Atmore High School.

to the consumer, keeping in mind needs and pocketbooks!

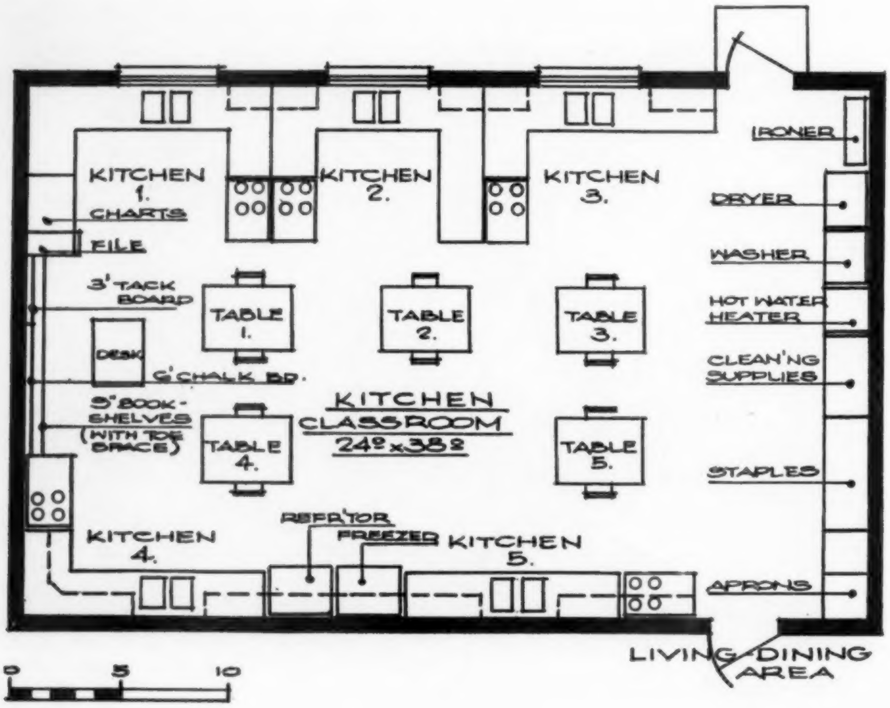
Multiple use of space is a trend in house planning. Reflecting this, flexible space in the homemaking department may be achieved through movable partitions, modernfold doors, multiple-use furniture, etc.

Homemaking is being recognized as a cooperative development, with men as well as women assuming home responsibilities. Forward-looking schools will plan and equip areas of homemaking for an instructional program for boys as well as girls, for men as well as women.

Guides in Planning

The overall objective of homemaking education is the improvement of home, family and community life through the training of youth and adults. In planning the areas for homemaking to contribute to this goal, the following criteria may serve as basic guides.

- Appropriate space and equipment are provided for teaching all phases of homemaking.
- The homemaking department has the atmosphere and furnishings of a real home and provides an environment in which pupils will be motivated to improve their own homes. Although the equipment is home type, it is selected to serve instructional needs and to hold up under hard usage.
- The standards exemplified in the furnishings and equipment can be achieved by the majority of the families in the school-community.
- The use of a variety of teaching methods is made possible for both individual and group learning through sufficient work centers, demonstration and discussion areas.



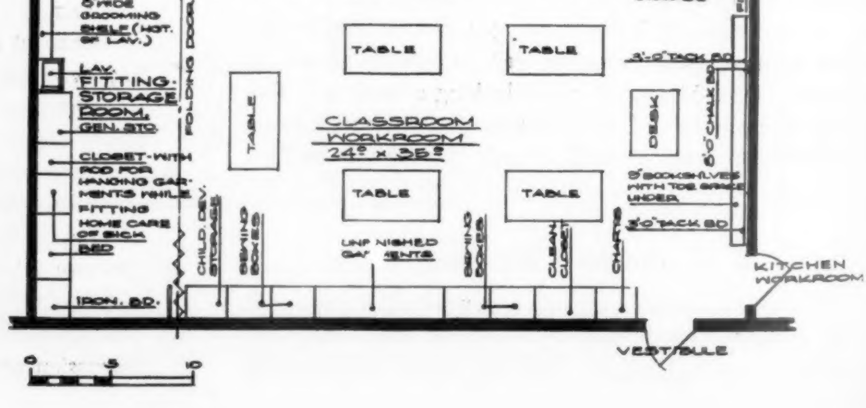
Floor plan for this kitchen-classroom has several desirable features. The peninsulas are short and provide open floor space. Tables and chairs are arranged so that they can be easily grouped for class discussion. The chalkboard and tackboard are in easy view. The laundry unit is accessible and does not interfere wtih the unit kitchens. One unit kitchen is adjacent to the living-dining room. The freezer is located for demonstration purposes and for use of pupils in the kitchens.

- The selection and arrangement of equipment, furnishings and storage encourage pupils to develop good habits and high standards of work.
- The department is designed for efficiency and is easy to keep clean, orderly and safe.
- The department serves as a teaching medium as well as a place to teach. New trends in home equipment and furnishings are evident and encourage the development of consumer competencies.
- Flexible space and movable equipment facilitate multiple use as well as changes in enrollment, curriculum and teaching methods.
- The teacher, pupils and community members are proud of the homemaking department and use it to the fullest extent for day school and adult education in homemaking.

Provision of Space

The Women's Congress on Housing recently reported that, as a group, they did not wish to endorse any special kind of house. It seems to follow that, as a group, home economics educators do not prefer particular types of buildings or equipment for teaching homemaking. Instead it is generally believed that homemaking areas should be individually planned for each school.

The type, amount and arrangement of space in homemaking departments are usually influenced by the curriculum offered, size of classes and number of homemaking teachers employed. Homemaking departments vary considerably from school to school and from state to state. The use of the all-purpose room has been accepted in many schools in which there are one or



This classroom-workroom and fitting-storage room plan has the room separated by a modernfold door. Storage space for reference materials, and the chalkboard and tackboard are near the teacher's desk. Sewing machines have been placed at the window wall for natural light. The triple mirror and lavatory provide a good grooming center. Storage is provided for ironing boards, a roll-away bed and other equipment used for home care of the sick. Storage for hanging garments is also included.

Furnishings in the living-dining room of the Atmore High School, Alabama, are attractively grouped. Prints above the sofa were framed by the pupils, using bark cloth.

more teachers. Other schools prefer multiple room departments.

The All-Purpose Room

One large room, equipped for the teaching of all aspects of homemaking, is known as the multi-purpose or all-purpose type. This room is usually planned to enable pupils to engage in the same activity at the same time or to work on different activities related to different homemaking problems. The work centers included in this room are four or more unit kitchens, a living-dining area, clothing area and a laundry-workshop-storage area (these may be provided together or in separate sections). The tables and chairs are selected to serve discussion-planning sessions and meal service as well as for cutting and construction of clothing. Chalkboard, tackboard and provisions for visual aids are included.

Open Floor Area

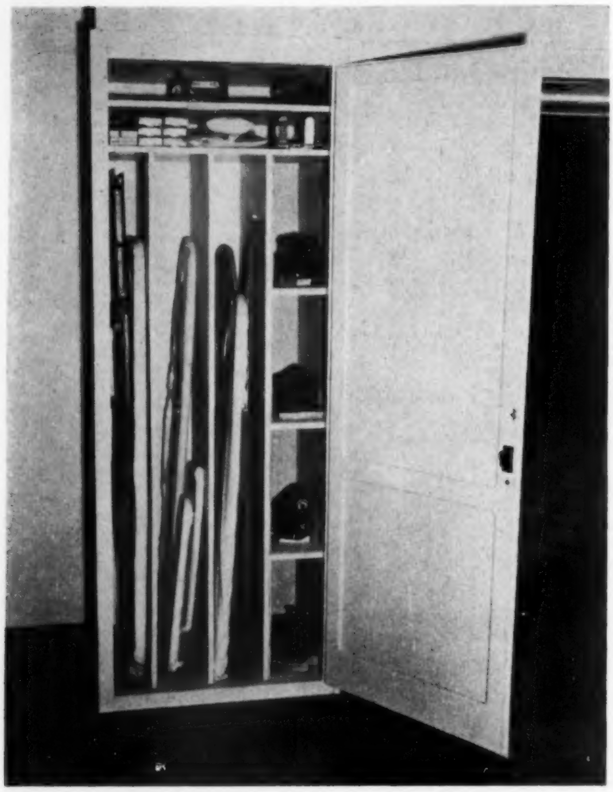
To avoid crowding and to make supervision effective, it is desirable to provide as much open floor area as possible for class activities in discussions and planning. This might be accomplished through avoiding the use of stationary projections or partitions. Movable partitions and modernfold doors serve to extend space when needed or for closing in space. Larger spaces may be needed for FHA meetings, banquets and other group meetings.

In planning the all-purpose room it is desirable to provide wall space to accommodate the number of unit kitchens needed, location of sewing machines, tackboard, chalkboard and wall storage.

The overall floor area for the all-purpose room is usually larger than is required for either a foods or a clothing laboratory, but less than the combined space for both. A width of 24 to 30 feet is recommended. Twenty-two feet or less is found to be too narrow.

With More Than One Teacher

When more than one teacher is employed, the one-room department is often repeated for each teacher. In these schools, it has been found that a separate living-dining area shared by all teachers has many



Storage for irons and ironing boards can be arranged in the same cabinet, with accessory facilities located on the upper shelves.

advantages. It would be located as accessible to all homemaking rooms, and would eliminate the need for a living space in each room.

The Multiple-Room Department

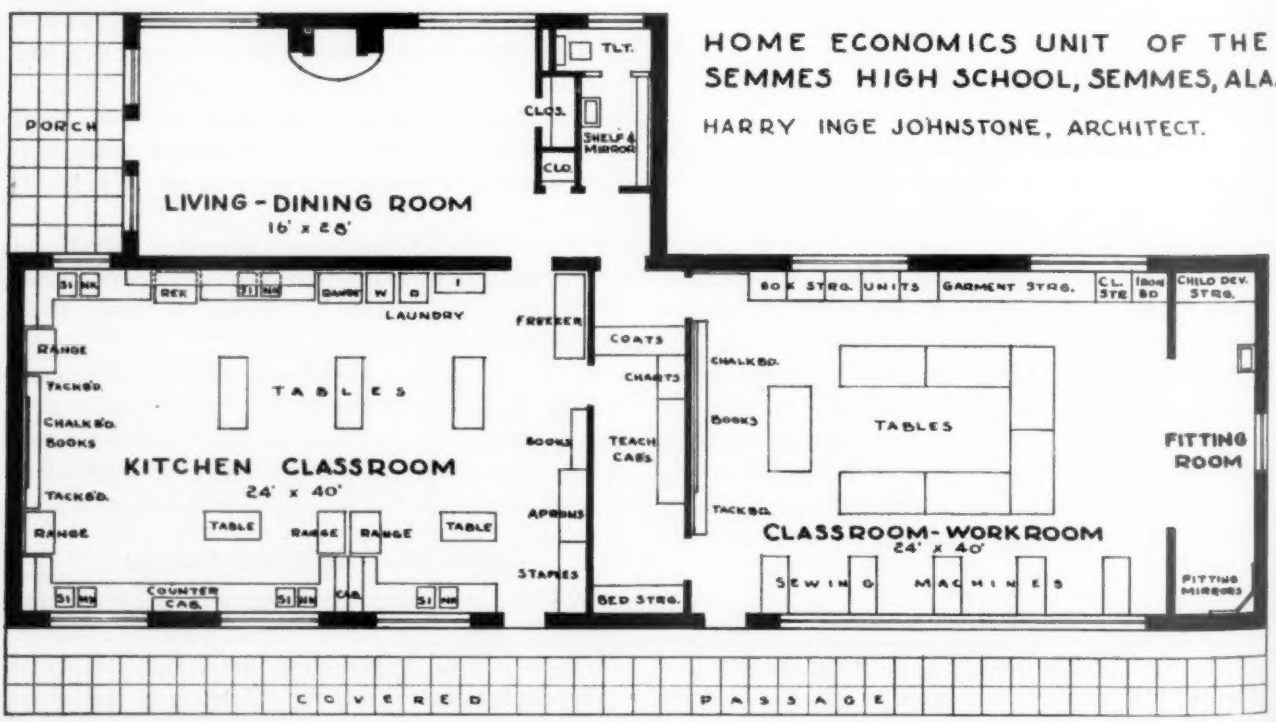
The multiple-room department includes two or more rooms and may be used by one or more teachers. The overall facilities are for instruction in all aspects of homemaking, but each room is planned for specific areas of homemaking. One room is usually equipped for teaching foods and nutrition, kitchen-planning and care, home management, home safety and home laundry. (Laundry center may be provided elsewhere.) Another room is provided for teaching family clothing, textiles, housing, child growth and development, grooming, family health, home care of the sick and family relationships.

Both rooms are equipped as complete teaching stations and have tables and chairs, chalkboard, tackboard, files and storage space for teaching materials and pupils' materials. The facilities of the two rooms may be used by one teacher, but are adequate for two teachers on a rotation basis, depending on the schedule of instructional units.

In most multiple-room departments a separate room is used as the living-dining area. This room is accessible to both classrooms and serves as a social center as well as for the teaching of relationships and the selection, arrangement and care of home furnishings.

In addition to these three rooms other areas are often included, such as a laundry center accessible to all rooms, a teacher's office and a fitting-storage room. Although storage facilities are a part of each classroom, it is often desirable to have a fitting-storage room in

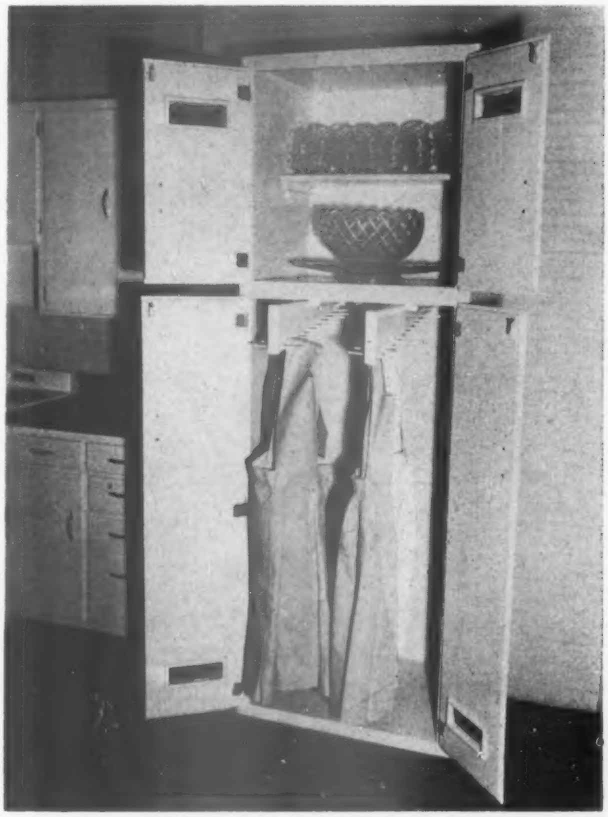
A storage room between the two classrooms of the Semmes High School homemaking department enables the teachers to share materials. This is a two teacher department. A covered walkway connects this separate building with the main school unit. The outside entrance to the living room makes this room accessible for community use.



connection with the clothing classroom, or accessible to both rooms.

The fitting-storage room is used for changing garments for fittings, for the storage of furniture being renovated and for storage of other materials and equipment used currently in one class but not needed elsewhere, such as equipment for home care of the sick or for a play-school. This space may be used to extend the area of a room by means of a modernfold door.

The multiple-room department may be planned for use by three or more teachers by providing additional teaching stations that are planned for particular instructional purposes. These would be shared by all teachers on a rotation basis.



Pegs on the diagonal serve for apron storage at the Central High School homemaking department.

Cabinet for chart storage, above, has free-swinging arms for holding the charts unfolded.

Storage Spaces in the Department

Well planned storage is important for convenience and efficiency as well as a means of teaching good standards of home storage. Storage facility requirements

In the unit kitchens much valuable storage space may be located in the base cabinets. Cabinets shown here are in use in the Monroeville High School (Alabama).

The classroom of the Monroeville High School, foreground, is separated from the sewing area by a modernfold door. Sewing machines are located along the window wall.

should be stated at the time the building is planned, and should be included in the blueprints and building contract.

Storage space should be planned specifically for the materials to be housed. In addition to the base and wall cabinets in unit kitchens, storage will be needed for the following:

Pupils' work materials. Space for sewing boxes and other work materials should be provided for each pupil enrolled in homemaking classes. Individual compartments or "tote trays" are used in most schools. Storage for pupils' work materials should be located near the entrance to the room.

Garments and wraps. Provision should be made for hanging wraps, unfinished garments, and for pupils' clothing during fitting. Rods for hanging should be adjustable if possible.

Charts. Carefully planned and well built chart storage is needed. Shelves above the chart rack may be used for storing other teaching materials.

Ironing Boards and Irons. Storage space should be provided for two or three portable ironing boards and two or three irons. Compartments for the irons should be lined with asbestos. This storage should be located near the ironing area.

Equipment for Home Care of the Sick and First Aid. Storage is needed for a roll-away bed, pillows, bed linen and other equipment.

Equipment for Child Growth and Development. Storage is needed for several low tables, chairs, books, toys and other play materials.

Books, Magazines and Other Reference Materials. Attractively arranged open shelves for books and magazines can add much to the appearance of the room. To

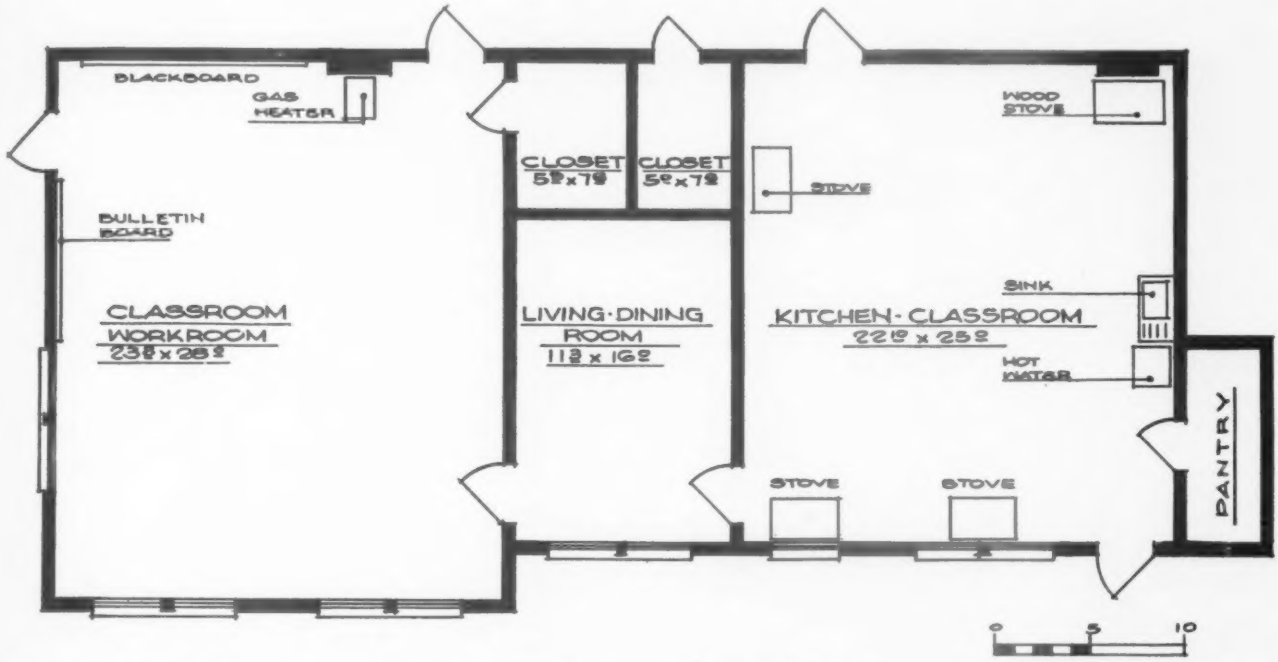
The door between the classroom and sewing area of the Monroeville High School, (see photo above), is closed to seal off the sewing room.

conserve space bookshelves may be located beneath chalkboard and tackboard. Toe space is necessary under the shelves for use of the chalkboard. Closed storage should be provided for magazines and books which are not in current use.

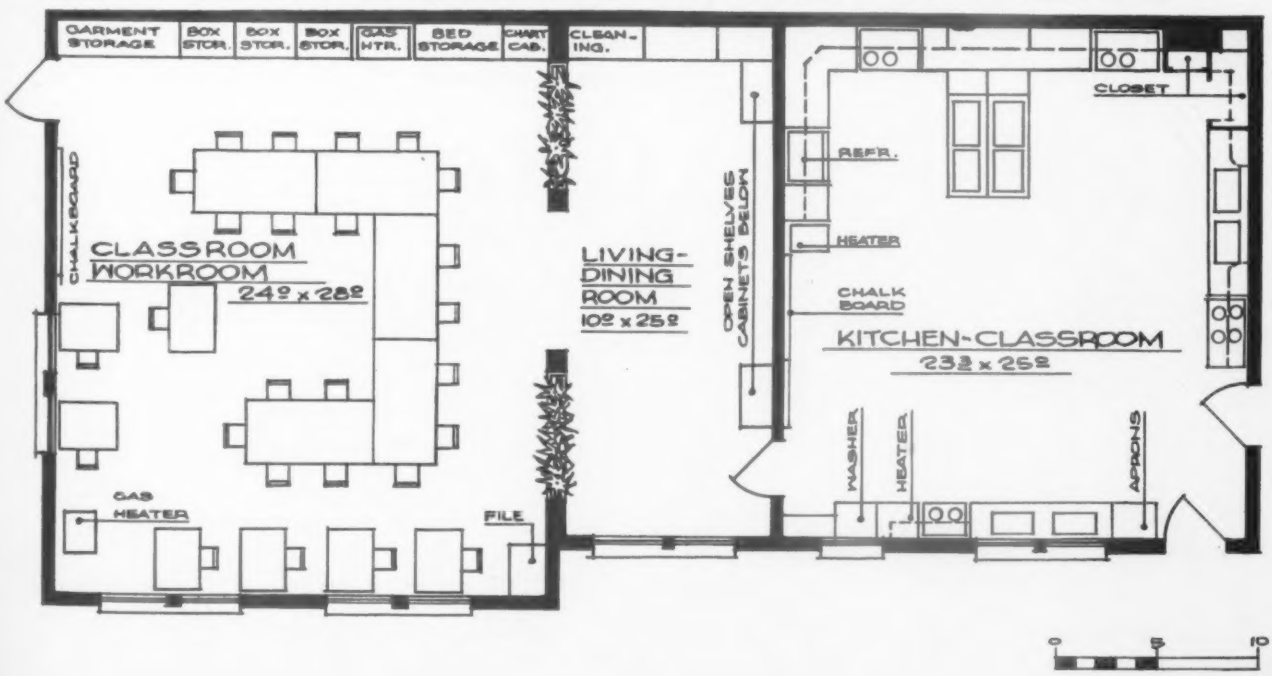
Audio-Visual Materials. A general storage cabinet with adjustable shelves is usually provided for this purpose.

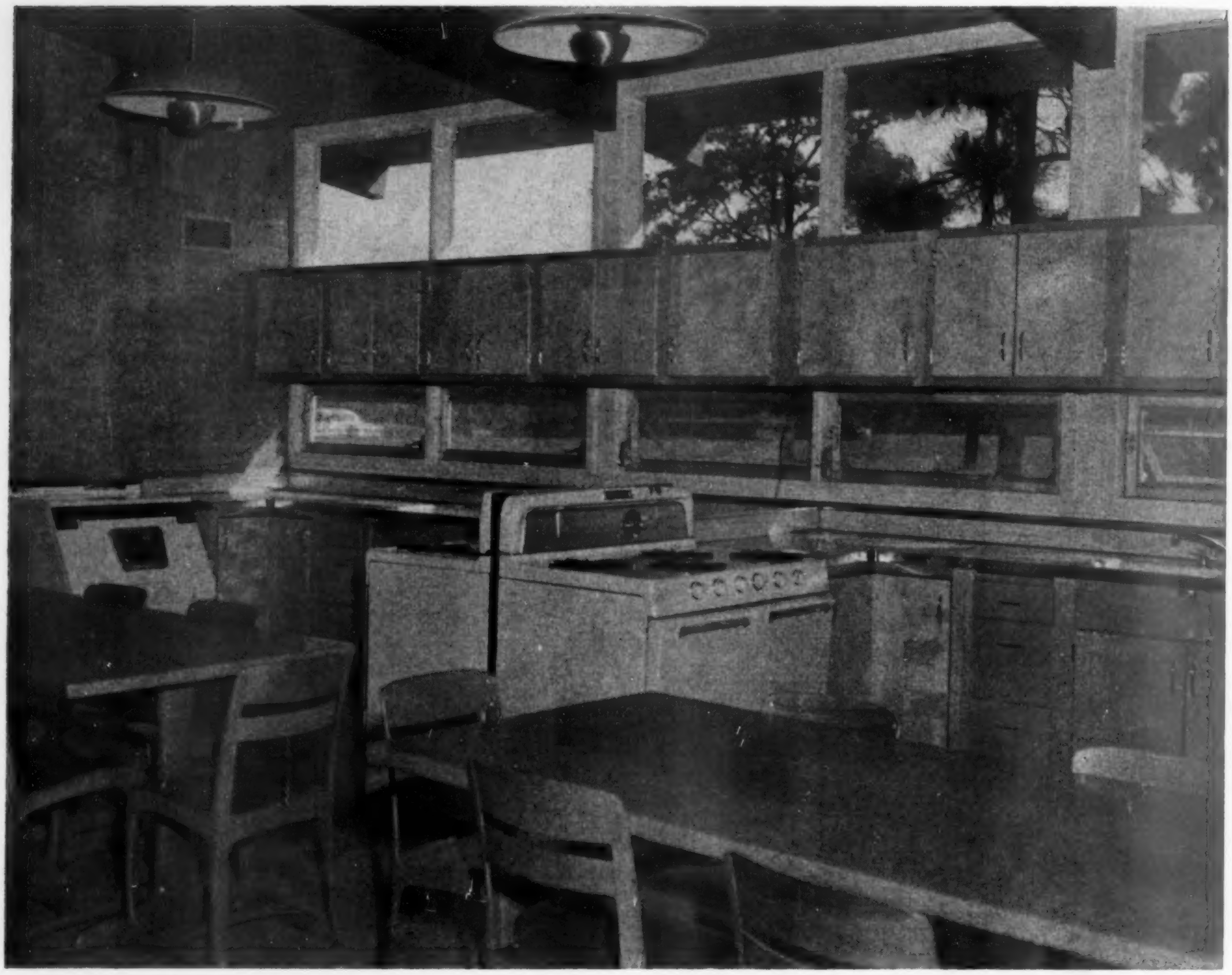
FHA Materials and Other Teaching Aids. Storage space with adjustable shelves, together with a filing cabinet, are needed for the materials used by the youth organization, Future Homemakers of America. Other teaching aids might be stored in specially designed cabinets having a combination of adjustable shelves and drawer space.

Cleaning Equipment and Supplies. The cabinet for



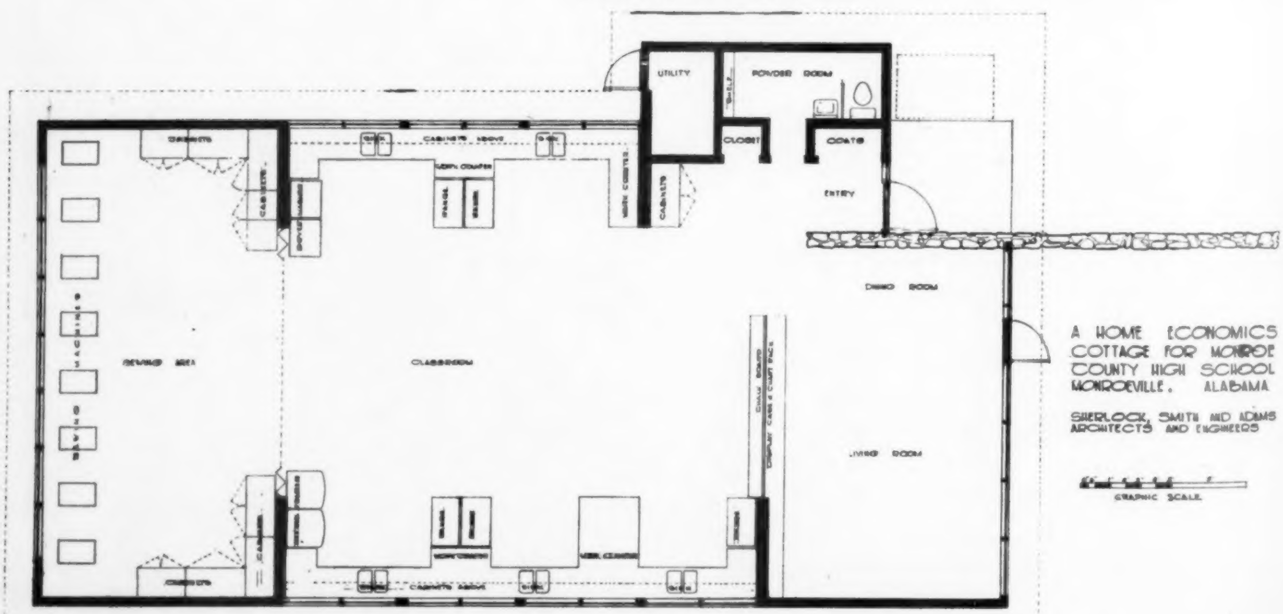
Plan of the Camden High School homemaking area is shown before remodeling (above). The living-dining room was small, the storage facilities inadequate, the kitchen-classroom was out-of-date and the entire department was inconvenient and unattractive. The remodeled department is shown below. The closet walls were removed to provide additional space for the living-dining area. The wall between the classroom-workroom and living-dining area was removed and a half partition for storage and plants was built. Storage space was built along the wall. Additions include four unit kitchens, each containing continuous base and wall cabinets, sink, range, chalk and tackboard, hot water heater and refrigerator. The result is a composite use of space and location of facilities.

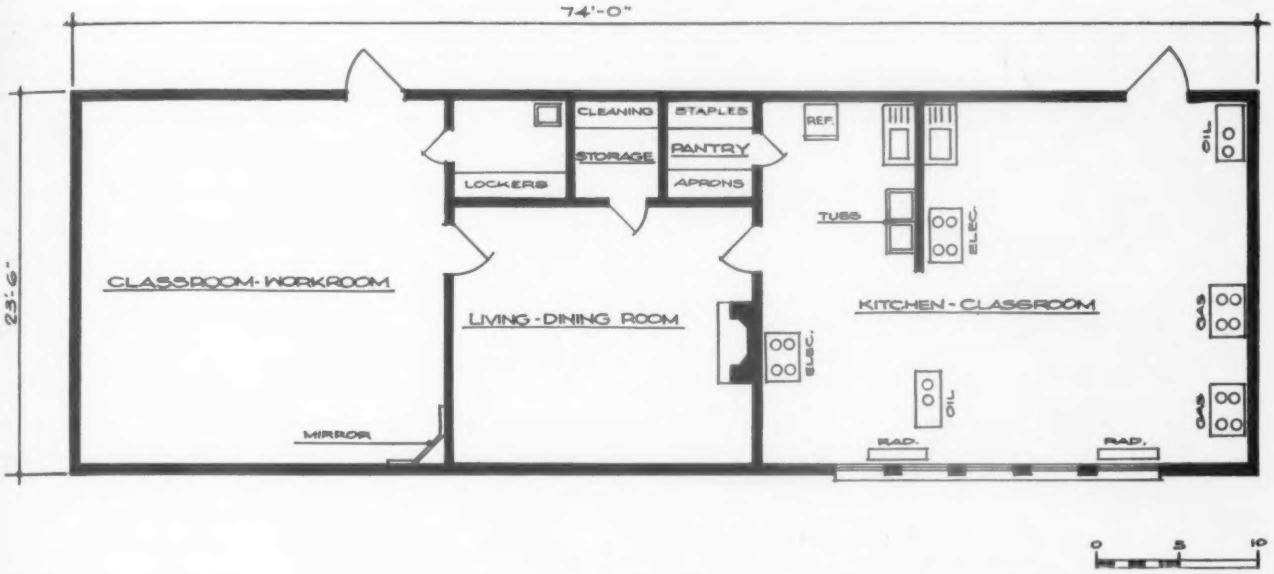




Wall cabinets are located along the window side of the all-purpose homemaking department in the Monroeville High School. Cabinets are attached to solid wall behind.

The one-teacher department in the home economics cottage of the Monroeville High School, designed by architects Sherlock, Smith and Adams, is a functional, homelike and attractive area. The living room is separated from the classroom by a half wall on which is located the chalkboard, tackboard and storage and display units.





Plan, before remodeling, of the Tallassee High School in Alabama. The areas were obsolete and storage throughout the department was considered inadequate.

these materials should have space and fixtures for brooms and mops, hooks for hanging brushes and electric cords, shelves for cleaning supplies and room for a vacuum cleaner.

Aprons. Each pupil should have a place to hang an apron or uniform. The type apron or uniform will determine the device that will be most satisfactory.

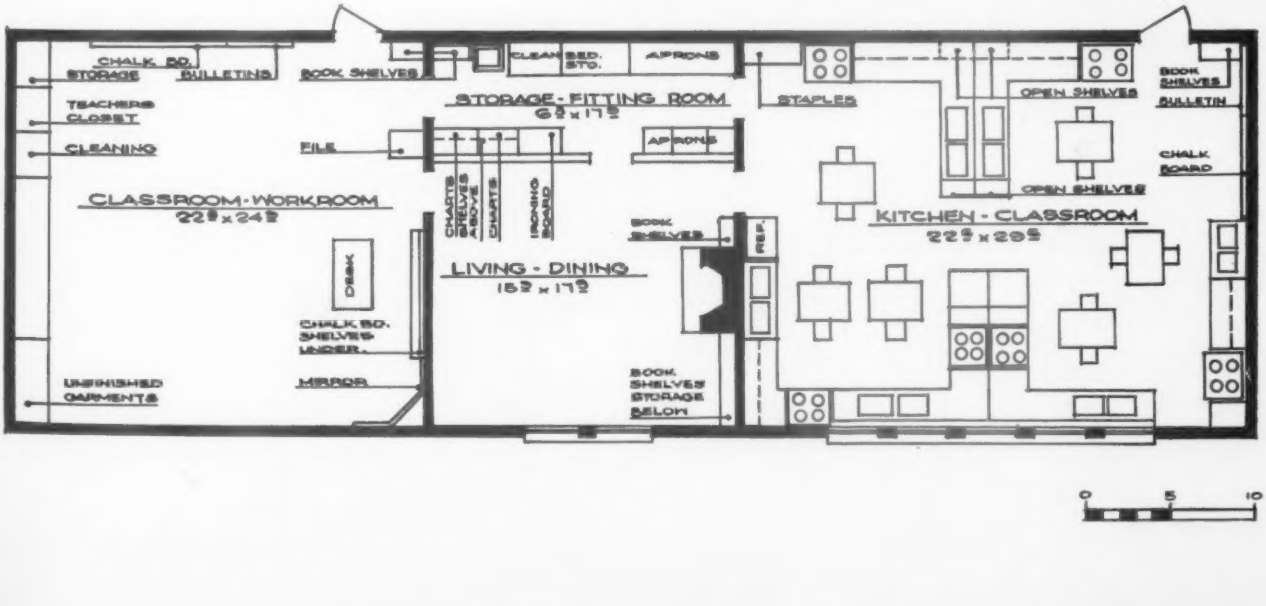
Staples. Space is needed for a reserve supply of staple foods and such equipment not stored in unit kitchens as roasters, pressure cookers, punch bowls, etc.

Some Desirable Storage Features

The arrangement and amount of storage space should be adequate and located for convenience and easy access. Some desirable features to be included in all storage are:

- The standard height of cabinets built into a room is seven feet and the standard depth (front to back) is 22–24 inches. (Storage space for frequently used articles should be within the reach of the majority of persons. For safety reasons the height of storage used by pupils should not exceed five feet.)
- The cabinets should be recessed or "furred" down to the top to improve the appearance of the room and to eliminate places where dust collects.
- The bottom of storage cabinets should be higher than the room floor except in cases where portable equipment is to be rolled in, as a roll-away bed.
- Toe space of 4 to 4½ inches should be provided under all cabinets.
- Shelves should be adjustable.
- Wooden doors should be kiln dried and sufficiently

Remodeled department of the Tallassee High School (see old plan above) now serves two teachers. Closets were combined to make a common storage area to be shared. Wall storage was provided, and kitchens were modernized.



The homemaking program should supplement the efforts of the home in providing learning experiences which will improve the quality of family life.

thick to prevent warping.

- Hardware used in cabinets should be durable and suited to the type of cabinet.

Remodeling Existing Areas

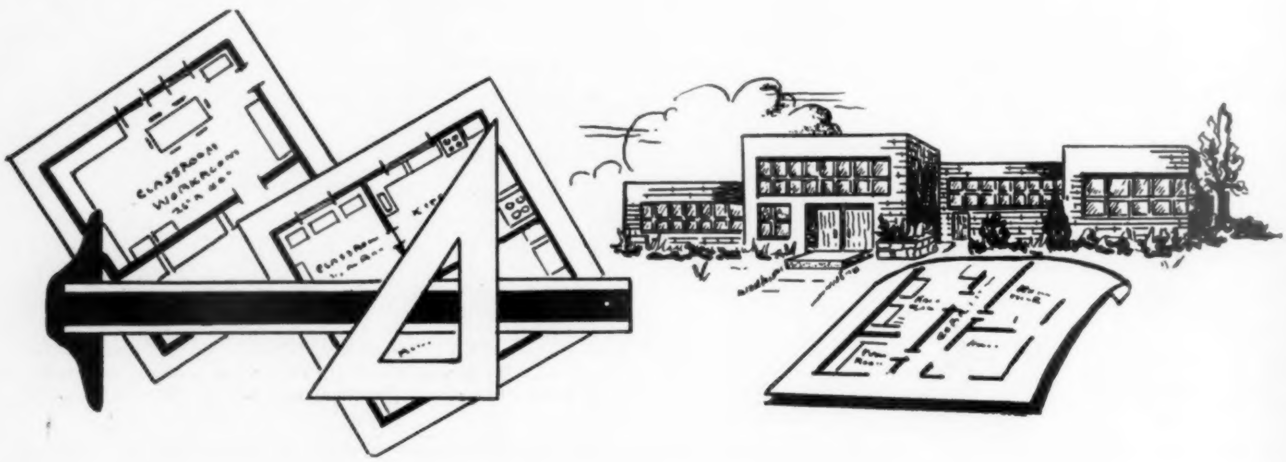
The homemaking curriculum is planned to help individuals to participate effectively in their own homes as family members today, and to prepare them for their responsibilities as the homemakers of tomorrow. In straddling two tenses, the present and future, the third tense, the past, in space and equipment is a handicap to effective instruction.

Although new buildings have replaced old ones and out-of-date facilities have been modernized in countless schools, there continue to be in operation many homemaking departments that are inadequate and obsolete. These outmoded facilities are not in keeping with trends in space and equipment in homes, and therefore adversely affect the interest of pupils and alter the quality of the homemaking instruction. The remodeling of old departments and the replacement of out-of-date equipment are major needs in many schools.

Improvements in Old Departments

Since the war, many improvements have been made in old departments to meet present day needs. These improvements include new equipment, toilet rooms, modernized kitchen-classrooms, removal of needless partitions and provision for improved lighting, heating and floor treatment.

A long-range plan for departmental improvements will serve as a guide for the year by year changes that can be financed.



Crown Portrait Studios

Designed by architects James M. Klontz and Associates, the new music building for Snohomish, Washington, is used by students in the junior and senior high schools.

SUGGESTIONS FOR PLANNING HIGH SCHOOL MUSIC FACILITIES

by G. A. MOORE

Superintendent of Schools, Snohomish, Washington

Raised in eastern Washington, Mr. Moore was graduated from Whitman College in 1927. He has also completed advanced study at the University of Washington, Eastern Washington College of Education and the State College of Washington. He has been superintendent of schools at Snohomish since 1947.

SNOHOMISH, Washington, Junior and Senior High Schools are located in separate buildings on the same 25-acre campus. The total enrollment of the two schools is 1200 students.

The shops, including auto mechanics, machine shops, agriculture and wood, are used jointly by both schools and are located in separate buildings. The music building is apart from the main buildings and is also used by all students.

Two years ago we decided that the old frame music building, then being used, could no longer accommodate our increased enrollment, especially if we were to offer the kind of music program we wanted. At that time a study was begun to determine how best to fit our needs.

Since funds were limited and we needed a separate music building, it was decided that the general construction would be a one story frame building with brick veneer. Spaces within the structure were to include a band room, choral and orchestra room, six studios, an organ room, theory and string classroom, two music libraries, offices and the necessary uniform and instrument storage areas. Toilets for boys and girls and a dressing room complete the interior areas.

Structural Recommendations

Listed below are the general recommendations in regard to the structure of the building:

General Structure

1. Since the floors are to be concrete slab construction, each room should be poured as a separate unit. Insulate the joints between the rooms to retard the transmission of sound.
2. Use offset studdings in the walls and insulate between studs.
3. If air ducts are used for heating, each duct should run from the source of heat instead of branching off from a main line.
4. The classrooms, lavatories and practice rooms

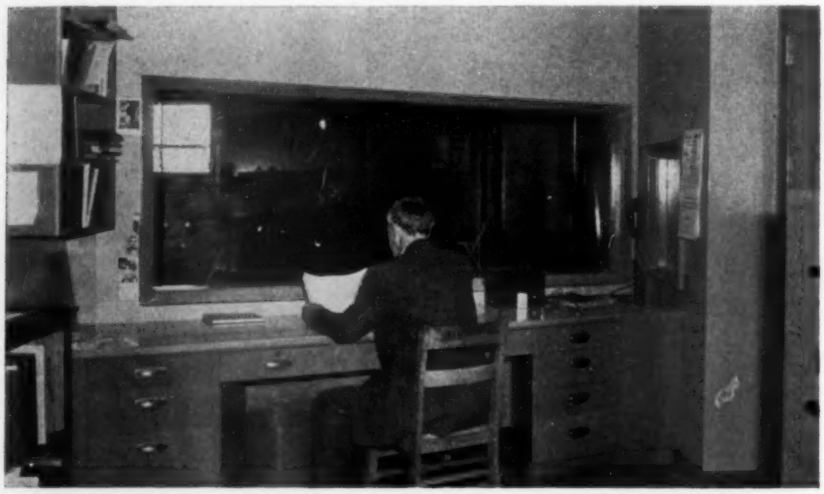
should be placed in the center of the building to act as a sound barrier between the main practice rooms.

5. Eliminate parallel walls whenever possible to prevent echoes.
6. A slanting ceiling will eliminate echoes which reverberate from the floors.
7. Reinforcing steel in the foundations should be broken. Otherwise it will carry sound around the building.
8. There should be no posts between double doors. This enables the moving of pianos, risers, etc.
9. Provide pigeonholes at building entrances where students, coming from other buildings, will have easily reached storage for their books.
10. Planters and display cases enhance the appearance of the building.
11. Choose colors in the various rooms as a person would for his home.
12. Where two panes of glass, with dead air space between, are used in the main practice rooms, the surfaces should not be parallel.
13. In regard to acoustical treatment, the ideal room should have brightness without echo.
14. Teachers' desks in the office should be placed in relationship to windows so that teachers can see the hall as well as the practice room.
15. Small auxiliary rooms should have acoustical tile so they may be used as additional practice rooms if necessary.

In addition to the general recommendations for the building as a whole, we also worked out suggestions for each teaching station.

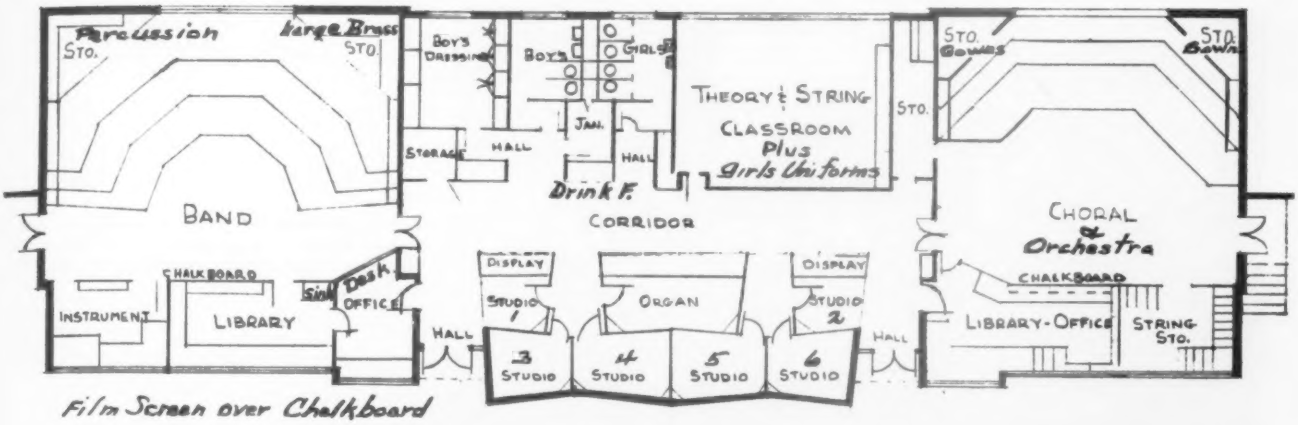
Band Rehearsal Room

1. There should be seating space for at least 100 instrumental musicians.
2. There should be three risers above the floor level. The first should be four inches above the floor, the second five inches above the first, and the third, six inches above the second. The first and second risers should be five feet wide, and the third, six feet or more to accommodate the larger percussion and bass sections.
3. The risers should be constructed at such an angle that all students will face the director full face. The director will stand five feet in front of the lowest riser.



Office of the band room has a viewing window which overlooks the rehearsal room. Furnishings include a built-in desk which faces toward the rehearsal room and hallways.

The music library has a ten-foot sorting rack hanging from one wall. Equipment includes four-drawer filing cabinets and a worktable.



Offices for the directors adjoin the band room and choral and orchestra room of the music building. Walls and ceilings of the practice studios are angled for sound control, see plan above. One of the several storage accommodations in the building is a space for uniforms and extra items (right).

Photos by Clayton Knittel

4. The front edge of the risers should be of contrasting color as a safety measure.
5. The space from the front riser to the chalkboard behind the director should be a distance of ten or twelve feet.
6. There should be a number of electrical outlets on risers and around walls.
7. Eliminate skylights, provide blackout curtains and place a screen above the chalkboard for visual aids.
8. Install hard paneling on the walls to a height of seven feet.
9. Place clock in rear of room to face the director.
10. Keep windows above the eye level of anyone either inside or outside the room.
11. Use vinyl floor tile that will take the abuse of oil from the instruments.
12. Construct a full set of built-in slots for the music of three full bands and one pop band.

Choral-Orchestra Rehearsal Room

1. There should be three risers in the room.
2. The lower riser should be six feet wide to accommodate two rows of vocalists or one row of instrumentalists.
3. The other two risers should be three feet wide. All risers are to be eight inches in height.
4. Since the room will also be used for orchestra, it should be adjacent to the string storage room for five basses, ten cellos and fifty violins.
5. Use cutoff corners of the room for gown storage.

Music Libraries

1. Provide space for eight or ten filing cabinets (four drawer).
2. Provide space along one wall for a ten-foot sorting rack that will hang from the wall.
3. Provide storage for phonograph records of various sizes and a record player.
4. In the band library a sink should be provided with the faucet far enough above the sink so that the instruments, especially the trombones, may be washed out. Provide a shelf for brushes, etc.

Storage cubicles for students' books are provided at the entranceway to the building. Hallway beyond has a display case built into the wall.

Clayton Knittel

5. Provide a worktable for paper cutter and tape dispensers.
6. Provide at least two electrical outlets.
7. Install bulletin boards.

Directors' Offices

1. The band director's office should have a small repair bench built in with drawers for tools, and a Formica top.
2. Provide a built-in desk overlooking rehearsal rooms and hallways.
3. Provide built-in drawers and storage space.
4. Install bulletin boards.
5. Provide a bookcase.
6. Provide a bench for a record player.
7. Install electrical outlets.

Studios

1. All studs should be offset.
2. Walls and ceilings should be angled.
3. Install overhead domes for light.
4. Install an electrical outlet.
5. All rooms should have hard paneling up to seven feet for ease of maintenance and to add brightness.
6. Provide good doors, but they need not be soundproof.
7. Plan flutter boards in corners, cut off half way to provide shelving.
8. Install tile or linoleum floors.

Result Is Satisfactory

We have been using the Snohomish High School music building for the past year. During that time we have found few things that we would change were we to build again.

We feel that the building is both functional and practical from a financial viewpoint. A great deal of the credit should go to those persons who devoted much time in study before actual plans were prepared. The architects are James M. Klontz and Associates.

AUDITORIUM-BANDROOM AT WOODSBORO, TEXAS

by WILLIAM A. REEVES

Superintendent, Woodsboro Independent School District, Woodsboro, Texas

A lifelong Texas resident, Mr. Reeves has a B.A. degree from Howard Payne College and an M.A. from Texas A. and I. College. He has also completed some graduate work at Texas University. Mr. Reeves has served the Woodsboro Independent School District since 1942, as a coach, high school principal and superintendent, except for the years 1944–1947 when he was employed as a chemist for the Stanolind Oil and Gas Company.

THE original school plant of the Woodsboro Independent School District, Woodsboro, Texas, was built in 1940 and consisted of classrooms and a gymnasium facing north. An addition was added in 1949 to house the homemaking department, library, three additional classrooms and the superintendent's office.

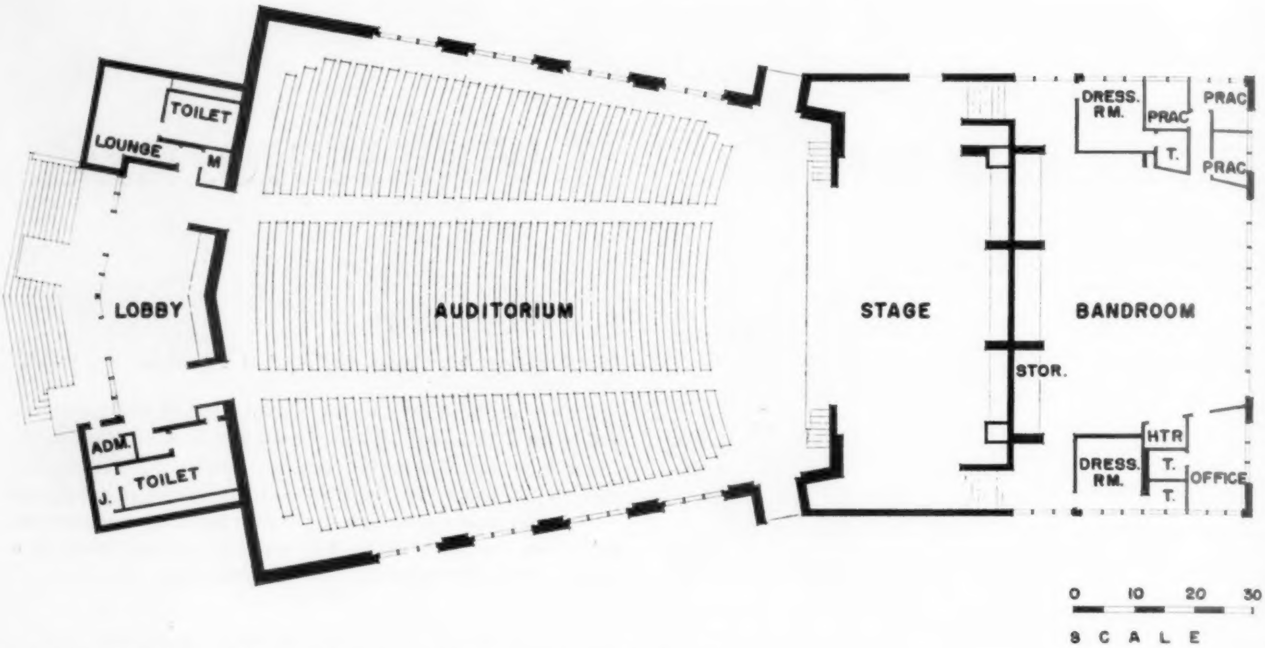
The opening of school in September, 1953, brought an unexpected increase in enrollment and necessitated the use of make-shift classrooms. The board of trustees and the school administrators immediately began to plan what has developed into one of the most modern plants of the area.

Time was devoted at each faculty and trustee meeting during the last months of 1953 to a discussion and planning session for new buildings. School patrons were invited to attend and express their ideas and opinions. Committees visited nearby towns to look at new school construction and to talk with those who had recently been engaged in building programs.

Two public meetings were held in January, 1954.

Northeast view of auditorium-bandroom, Abbott & Evans, architects.

Fritz Herr



Main areas of the building are the auditorium, stage and bandroom. Auxiliary spaces include the lobby, lounge, dressing and practice rooms, office, storage areas and toilets. A ticket office is located near the main entrance.

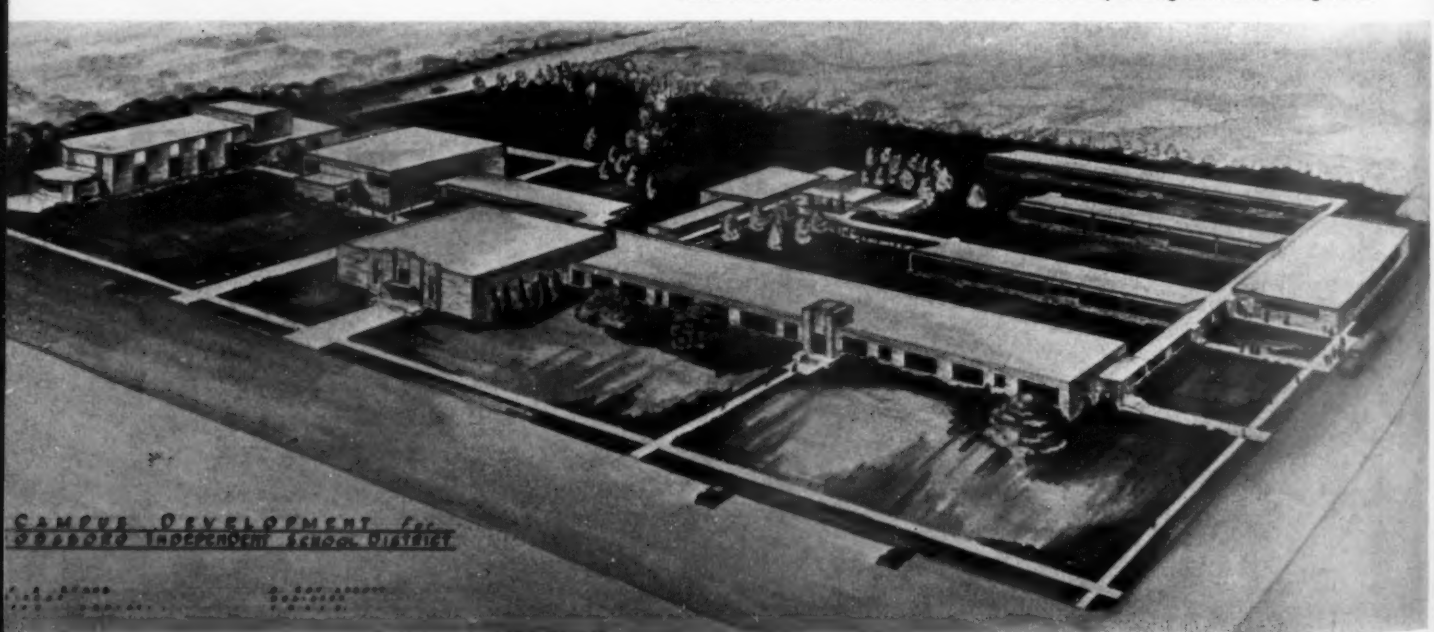
These meetings were well publicized and were attended by members of the community. The architectural firm of Abbott & Evans, Corpus Christi, Texas, was engaged to make preliminary estimates for a long-range campus development program.

The first part of the program was to be a building of 16 classrooms for grades 1–5, with a cafetorium to seat 300. The second phase of the program was the construction of a 1,000-seat auditorium, with a bandroom attached to accommodate 100 pupils. At an early February meeting, the school trustees studied the estimates presented by Abbott & Evans and called for a public meeting.

Patrons of the district agreed to petition the board of trustees for a $750,000 bond election for the construction program. A tax rate increase of 30 cents per 100 dollars evaluation would service the bond issue. Petitions were presented to the board and an election was called for February 20, 1954.

Campus development sketches were posted in the

Campus development of the Woodsboro Independent District, auditorium-bandroom is at the left. Plant facilities have been expanding with district's growth.



Seating capacity of the auditorium is 1,000. Lighting is controlled from a panel at the left of the stage. Behind the stage are the bandroom, dressing rooms, practice rooms, an office and storage areas.

business houses and each home received a letter from the superintendent's office with a full explanation of the plan and the costs involved. The largest vote of the district gave the board of trustees the needed "go-ahead." R. A. Underwood & Company, Inc. of Dallas, Texas, was hired to do the legal work for the district and Abbott & Evans began to prepare preliminary plans.

Bids for the First Phase

Bids were called for $375,000 of the bond issue on March 16, 1954. Eleven firms submitted bids with average interest rates from 2.03 percent to 2.18 percent. The bonds were sold with a ten-year option. On June 18, 1954 the construction firm of Walter Droemer was the successful bidder on the first phase of the Woodsboro Independent School District development program, at $287,300. This was the low bid of the nine firms bidding on the project. The completed buildings, 16 classrooms and a cafetorium, were approved in May, 1955, and occupied two weeks before school closed for the summer.

A bond sale on March 3, 1955, started the second phase of the Woodsboro school development program. The remainder of the $750,000 bond issue was offered with a ten-year option. Five firms bid on the bonds with an average interest rate ranging from 2.686 percent to 2.917 percent.

Abbott & Evans had plans ready for construction of a double-area gymnasium and auditorium-bandroom, and the bid date of early March found twelve construction firms bidding. O. J. Beck & Sons of Corpus Christi, Texas, were awarded the work at $360,186. Construction was completed in May, 1956.

Construction Materials and Methods

The auditorium-bandroom was constructed on concrete slab with a steel frame. The built-up roof was placed over a steel deck. The use of aluminum panels not only reduced weight on the foundation but helped in containing the cost. The panels represented a first in school construction in the area and drew divided comments from the community. The interior of the auditorium is treated with acoustical plaster, and a conversation in normal tones on the stage can be heard easily at the rear of the building.

School officials at Woodsboro feel that the school

belongs to the people. At no time has public support been withheld when the people were informed. The community is invited to use the buildings and hardly a week passes without some group doing just that.

Interior Areas of the Structure

The auditorium-bandroom, part of the second phase of the campus development plan, is entered from the north, or front, by way of a lobby. Seating capacity of the auditorium is 1,000. Lighting is controlled from the panel at the left of the stage. Dressing rooms are located at the rear of the stage and also serve the bandroom.

The bandroom may be closed off from the dressing room areas by sliding doors, and will seat a 100-piece band without crowding. Ample storage spaces for uniforms and instruments as well as practice rooms and director's office are part of the facilities. The bandroom is entered from the south and is connected by walks to the street and to the remainder of the school campus.

The auditorium-bandroom was constructed on concrete slab with a steel frame. The built-up roof was placed over a steel deck. Aluminum panels reduced weight on the foundation and lowered costs. Construction was completed at a cost of $360,186.

CITIZENS FINANCE PADUCAH'S MEMORIAL STADIUM

by RALPH W. OSBORNE

Superintendent of Schools, Paducah, Kentucky

Dr. Osborne received his B.S. degree from Bridgewater State Teachers College, his M.Ed from Boston University and his Ed.D. from Harvard University. He served with the U.S. Air Corps from 1942-1946, and then as superintendent of schools, Plainfield, Conn., from 1946-1951. After a year of field work at Harvard University, Dr. Osborne took up his present post in 1954.

A COMBINATION of precast, prestressed concrete construction, that reduced costs and made possible a four month construction time, and unique financing methods by a citizens committee have given Paducah's Tilghman High School a modern 5000 seat capacity stadium of distinctive feature. With the addition of 2800 seats in steel bleachers moved from the previous site, the new structure is a school-community stadium with ideal seating, excellent lighting and surplus parking areas. Geographically, it is located in the center of the city on a 26 acre high school site.

Interest in a new stadium followed completion of the $3,000,000 high school, termed by many visitors as "the finest in the South." The inadequacy of the old stadium, located a mile and a half from the new school, was well known. Interest grew not only in a plan to provide a stadium at the new location but also in the determination that it be of a quality to match the new high school. Since the Board of Education did not have the additional money to construct the stadium, a group of civic leaders launched and rapidly carried out a spectacular drive for sufficient funds to warrant construction.

First publicity for the project was given at the 1956 Thanksgiving game. This was immediately followed by a full-page feature article in a Sunday edition of the Paducah Sun Democrat. Publicity continued through radio, press articles and talks to civic organizations. Despite the timing of the drive, at the close of the football season, the tremendous energy and promotional methods resulted in funds being raised and the stadium being constructed and dedicated only eleven months later.

Architect D. Clarence Wilson of Mount Vernon, Ill., designed the Paducah Stadium. Stadium, seen here from the end zone, was constructed with local aid.

Publicity of the Citizens Memorial Committee pointed out the untold advertising that Paducah had reaped from Tilghman's gridiron successes. It showed that football games provide the Tilghman Band and the outstanding Girls' Drill Corps their main opportunity to perform before the public. It stressed the calibre of Tilghman football that makes possible a schedule that includes teams from Louisville, Memphis, Tennessee and Little Rock, Arkansas. Chairman and spark plug of the committee was Tilghman alumnus and former sports writer, radio executive Sam Livingston. The press box was later named in his honor.

Raising the Money

The methods of obtaining funds were varied. Most successful was the appeal for $500.00 contributions toward construction of boxes. Plans called for 72 boxes, each containing four stadium-type arm chairs. Located on both sides of the 50-yard line, they were placed high enough for excellent viewing. Their preferred location as well as the prestige factor, was of help. Donations of $500.00 were received for all boxes. Bronze plaques memorializing or honoring those whose names appear on them were placed on the rail before each box. Each contribution carries with it the privilege of purchasing tickets for that particular box in future years.

The four gates and the main ticket office were offered as memorials for $5000.00 contributions. Three of these have been accepted to date and named in accordance with the desires of the donors. Plaques were also furnished and placed on the sides of the ramp entrances giving credit to civic organizations, unions and other community organizations making contributions of $500.00 or more.

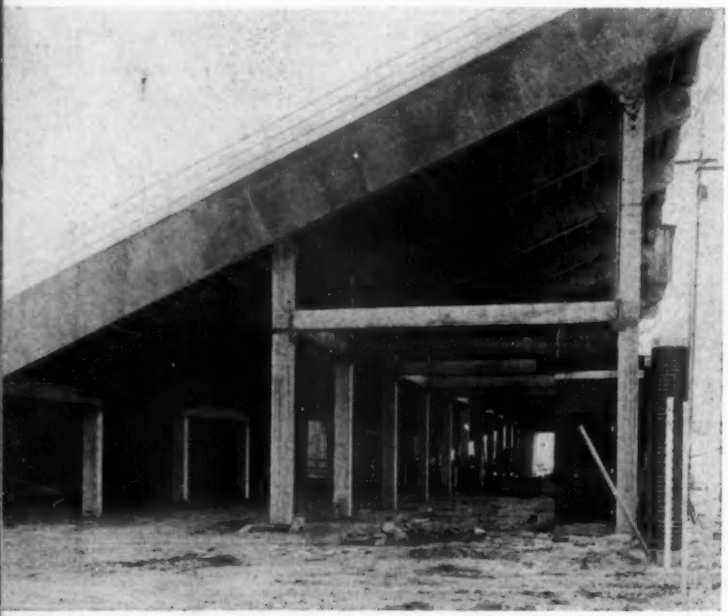
Mass appeal took the form of a fifty dollar request for construction of a bleacher seat. The appeal was made especially to the alumni. A five dollar contribution plan was offered. Of interest, some parents made donations for children not yet of high school age. A narrow bronze plaque was placed before each seat giving the name of the contributor or the name desired by the contributor. The fifty dollar contributions carry no future ticket advantage. The net result to date of these methods is over $128,000 pledged with 96 percent of the amount received.

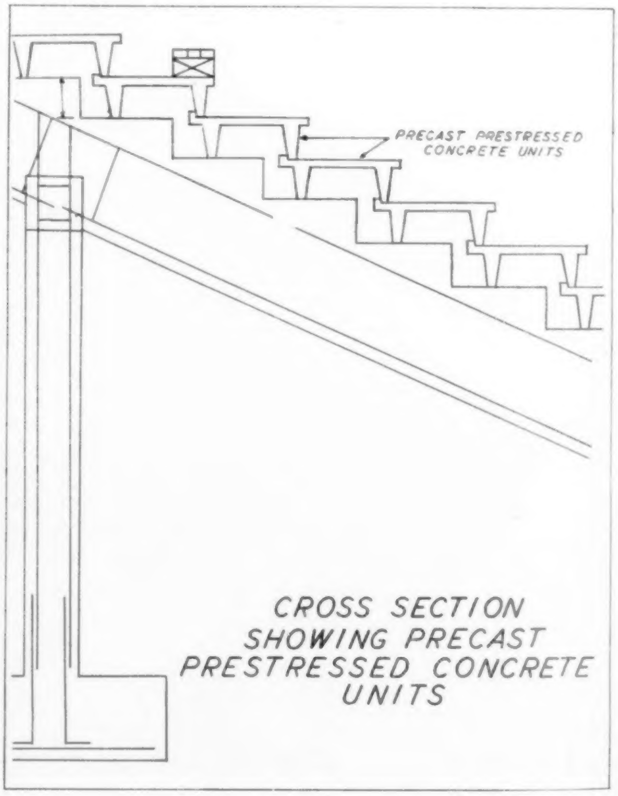
Architect Is Engaged

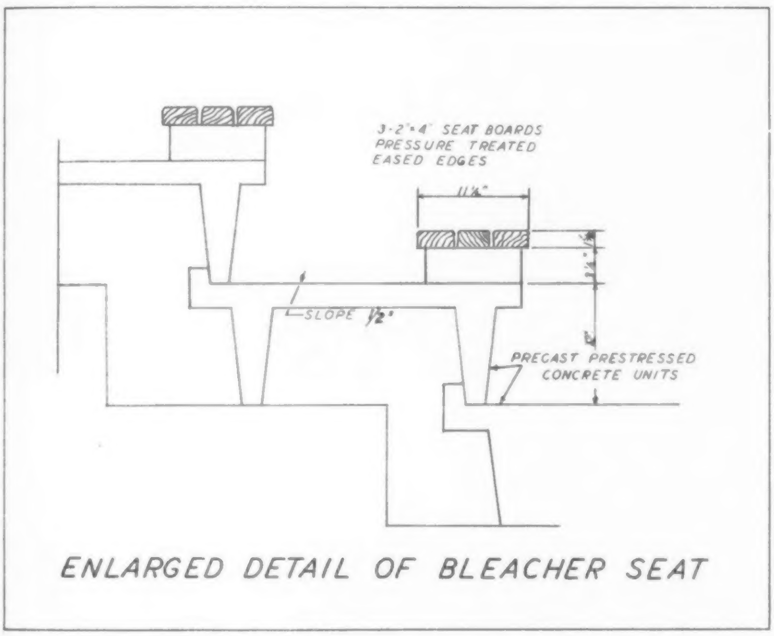
With this display of community confidence, the Board of Education engaged D. Clarence Wilson of Mount Vernon, Illinois, the architect for the high school, as architect for the stadium. In due course bids were requested. The basic bid included box seats as well as bleacher seats, four brick memorial gates, three ticket offices, a spacious press box, entrance gates, vomitories and walkways. Toilets, dressing rooms and an industrial arts shop were included as alternates.

Lighting and fencing were considered as separate items. Over $10,000 had previously been expended by the high school athletic association for the development of the field. Original specifications called for structural steel and formed concrete. Outside dimensions were approximately 290 feet by 81 feet. Low bid for the

Prestressed, precast concrete units compose the treads and risers. Girders, spanning from support column to support column, are stepped to receive the concrete precast units. Units were raised and dropped into place.







Portion of the Paducah High School may be seen in the background of the stadium view above. The entire high school site, including the new stadium, comprises 26 acres. Pressure treated seat boards, with eased edges, finish off the bleacher seats, see left.

basic structure only was $238,342, an amount far in excess of expectations. For a time, it looked as if all plans would be dropped until a much larger sum could be raised.

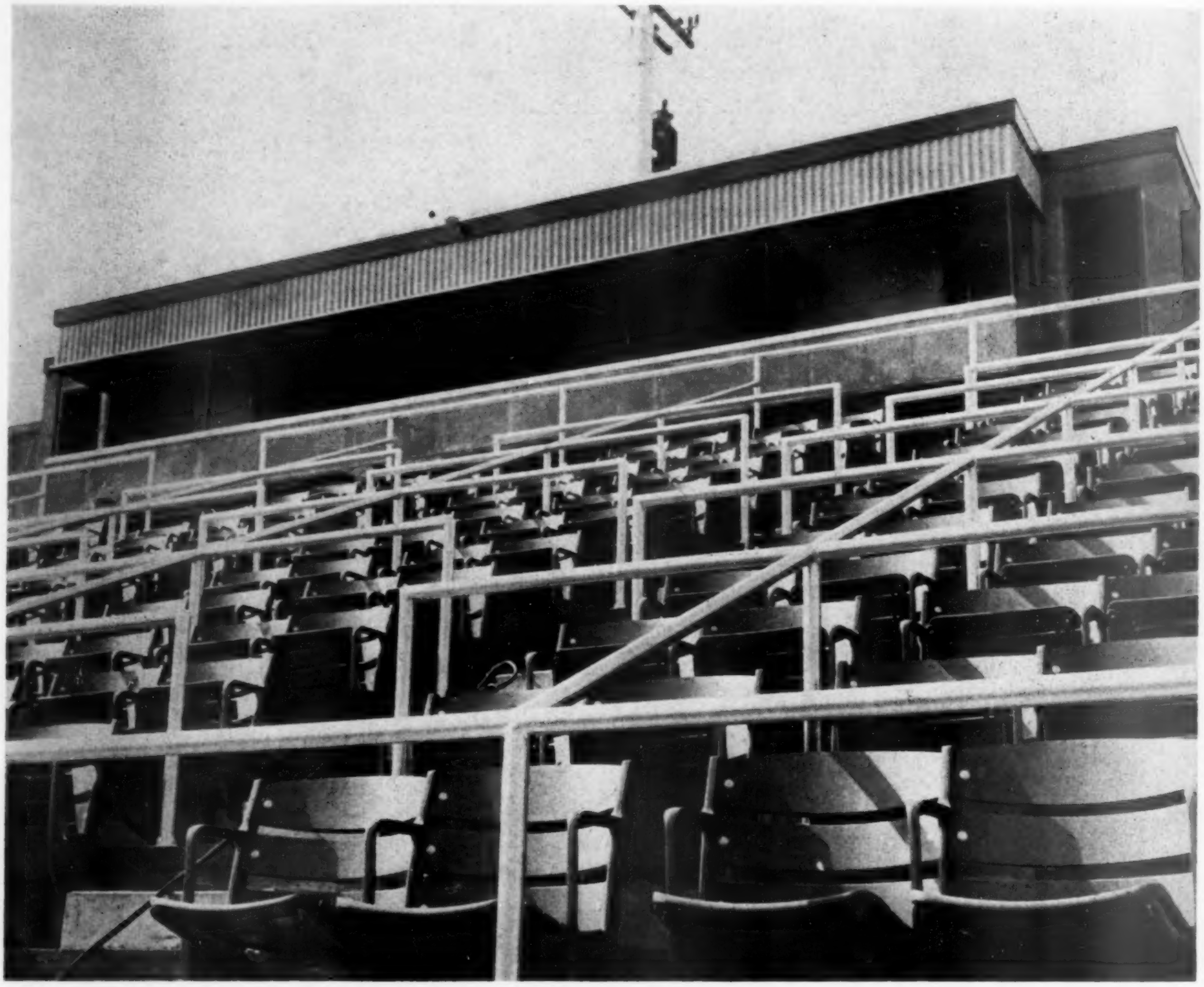
A Counter Proposal

A counter proposal was made by officials of Portland Cement Company for concrete construction using precast, prestressed tread and riser units. This eventually was accepted with a contract negotiated with the low bidder, Chism & Miller, Incorporated of Paducah. The contract price of $172,718 represented a savings of $65,624. This was the first use of precast, prestressed construction for a Kentucky school facility.

Precast Construction Methods

Basic construction is of reinforced concrete. The footings bear on undisturbed soil and support columns. Girders, spanning from column to column, are stepped to receive the precast, prestressed tread and riser units. This procedure involves the latest developments in reinforced concrete construction.

Channel units, 21 feet long and 12 inches thick where the prestress is placed, were trucked from the forming plant in nearby Madisonville. The units are designed to support a live load of 100 pounds per square foot in addition to the weight of the unit. Units were raised and dropped into place. Thus the decking of the stadium involved no concrete forming on the job.



There are 72 stadium boxes, located on both sides of the 50-yard line. Donations of $500.00 were received for all these boxes. Bronze plaques, honoring the donors, were placed on the rail before each box. The appeal for donations for the stadium boxes was the most successful of the fund raising campaign.

Lighting was installed after separate bids were received. Illumination was mounted on six 100-foot tubular steel poles set in concrete footings 12 additional feet deep. Each pole holds twenty-four 1500-watt lights for a total of 216,000 watts. While the poles were still on the ground, lights were attached and adjusted in accordance with an aiming diagram furnished by the manufacturer, Revere Electric Manufacturing Company.

Someone facetiously suggested that the lighting be sufficient for reading the classified advertisements of the local newspaper. With an average of 23 foot-candles of light on the field and a maximum variation of only 2 foot-candles from the darkest to the brightest spot, this quantity of light has been virtually achieved. Much of the labor was donated by the local electrical union.

Chain link cyclone-type fencing was used. A large modern scoreboard was a gift of the Coca Cola Company. The local carpenter's union furnished much of the labor of moving portable steel bleachers that comprise the seating on the opposite side of the field. Gravel for parking areas was donated by the city, county and state highway departments.

A Corporation Is Formed

With some cost being borne by the Board of Education, the amount of $95,000 still remained to be met on the basic structure. A method of financing was developed whereby the Citizens Committee became the non-profit Paducah Tilghman Memorial Stadium Corporation. This corporation is to continue until the stadium is paid for or until the board assumes any outstanding financial obligation. Complete control of the use of the stadium remains with the school authorities. The stadium itself became the technical property of the corporation and was mortgaged for $95,000 to three local banks. Mortgage arrangements call for payment over the next five years. Fulfillment of pledges has already reduced this amount by $22,000.

Future financing is expected to be met through a television campaign for the sale of more fifty dollar

Illumination for night games is provided by six 100-foot tubular steel poles, each holding twenty-four 1500-watt lights, for a total of 216,000 watts. Lighting was installed after separate bids had been received.

Lights were attached to the steel poles while they were still on the ground, and adjusted according to an aiming diagram furnished by the manufacturer. Much of the labor involved was donated by the local electrical union. There is an average of 23 foot-candles of light provided on the field, with a maximum variation of about 2 foot-candles from the darkest to the brightest spot.

seats, and through increased revenue at football games. The local Junior Chamber of Commerce has donated $1,500 annually from the proceeds of a Christmas basketball tournament. Total value of the facility, as it now stands, is estimated at $225,000.

Other Facilities Are Planned

In addition to meeting mortagage payments it is expected that additional contributions will make possible other facilities. These include toilets, now under construction, fieldhouse facilities for all outdoor sports, concession stands, and at least one industrial arts classroom. All of these are to be constructed beneath the present structure, with completion as soon as possible.

Space has been provided for later construction of a regulation quarter-mile track within the fenced area. Duplication of the present 5000 seating capacity on the opposite side of the field is a future possibility. Parking facilities within three blocks of the school accommodated a near-capacity crowd last season.

Paducah Memorial Stadium is locally looked upon as an indication of the great interest of the community in providing adequate school facilities. Modern precast, prestressed concrete construction and an enthusiastic group of citizens have made possible a superior sports stadium enjoyed by the whole community.

Finishing touches are being added to one of the four brick memorial gates leading into the Paducah Stadium. Donations of $5,000.00 each were received for the gates, and they were named in accordance with desires of the donors.

NEW SCHOOL SHOP PROGRAMS AND FACILITIES

by EDWARD M. CLAUDE

Chief, Trade and Industrial Education, State Board of Vocational Education, Springfield, Illinois

Mr. Claude has a bachelor's degree from Colorado State University and a master's from Bradley University. He has done graduate work at the University of Alabama, Stout State College and Bradley University. He has been engaged in trade and industrial education for the past 31 years. His supervisory experience includes positions with the Alabama State Board of Vocational Education, and the U.S. Office of Education.

and AMOS D. COLEMAN

Supervisor, Industrial Arts Education, State Board of Vocational Education, Springfield, Illinois

Mr. Coleman has a B.Ed. degree from Southern Illinois University and an M.S. from the University of Illinois. He has served in his present post since 1948. Prior to that time he was head of the Industrial Education department at the West Frankfort, Ill., Community High School. Mr. Coleman has spent 27 years in active educational work, including twelve years in public school administration.

MUCH progress toward the development of adequate and desirable industrial education programs has been made during the past decade. One of the important phases of this progress is the provision of suitable school shop facilities to house properly and otherwise provide for improved programs. It is common, indeed, to find teachers, local supervisors and administrators who have had experience in planning some kind of new school shop facilities.

The present tendency toward rapid increases in school enrollments brings about a corresponding necessity to provide more and better school buildings. Many people, therefore, who have not had such planning experiences will, in the near future, be called upon to provide planning guidance and direction to insure adequate and functional building facilities for industrial education programs.

Need for Careful Planning

The need cannot be overemphasized for exercising the greatest possible care in planning school shops. Much regret and even embarrassment will be avoided by proper regard for the function and feasibility of the shops to be built. With the vast amount of information and experience available today, there is little reason for the teacher or administrator to provide less than the best in regard to school shops.

The local industrial education teacher and school administrator cannot shift their planning responsibility to the boards of education, architects or outside consultants. It is their duty to obtain the information on what is needed and to let boards and architects know what they want.

Working with the Architect

This is not to say that the counsel and help of the architect should be neglected. Every opportunity should be seized to learn from him any information on new construction features, new materials or new designs with which he will be familiar. He should be relied upon for advice on such things as strength of materials, methods of support, wall construction and structural details.

It is always well for the school administrator to rely on professional educators for guidance regarding the number and type of shops needed, factors determining the shop function, and the type of program to be offered. These factors materially affect the arrangement and structure of the building.

Services from Outside Sources

In most states there are available the advice and services of state supervisors of industrial education who know the function and operation of school shops. These

men are familiar with the most effective programs in the state and with modern teaching techniques. They are, therefore, in a position to render dependable assistance on matters of program, shop function, details of shop operation and the provision of needed auxiliary facilities for each area of work.

State Departments Give Aid

Building consultants in state departments of education are often able to give the local school shop planning group first hand advice and other assistance. Some larger cities have their own building consultants who should be included in any shop planning done within their area of operation.

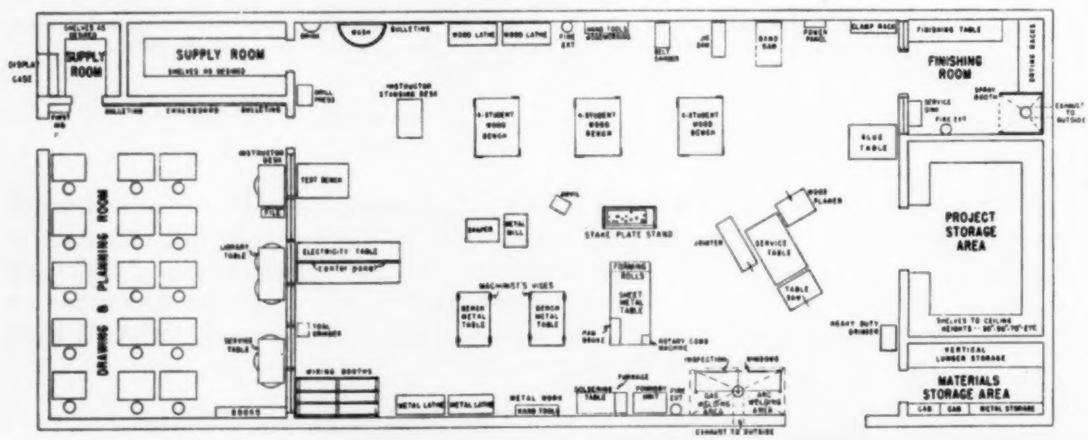
Perhaps one of the very best sources of help in this matter is that offered by the college personnel who are engaged in training industrial education teachers. Staff members of college industrial education departments are well qualified to act as capable, helpful consultants. The authors have found these men most willing to cooperate with school authorities on problems inherent in planning good shop facilities. The helpful service thus rendered is most valuable.

Selecting the Program

One of the first problems to be considered is a determination of the type of program to be provided in the new shops. Before a satisfactory answer can be found, it is necessary to consider several factors. What are the various types of organization for an industrial education program? What are the learner needs to be considered? What is the present and future prognosis on school enrollment? How extensive a program should be planned? What funds are available for school shop construction?

The Unit Shop

There are several possible types of organization for an industrial education program. Perhaps the oldest type, and at one time the most widely used, is the unit shop. A unit shop is that in which a single industrial activity is carried out, such as welding, machine shop



Plan for a typical one-teacher general shop with an overall size of 40′ by 98′.

This general shop has wisely been provided with plenty of natural light. Good lighting is important for safety as well as accuracy in shop work.

or cabinet making. The unit shop program offers perhaps the best teaching situation of all. It is by nature a specialized shop, and one which seriously limits the scope of the total program unless several unit shops can be provided.

The unit shop is most often found in the largest schools, and it is usually employed in a series, with different units used to present a variety of program. The instructor is a specialist in his one area or one phase of an area of activity, and for that reason may do more intensive teaching than a teacher who must present more than one area of work. A unit shop program is now found, for the most part, in schools with an enrollment of 1200–2000 students, with perhaps four or more shops in the program.

The General Shop

The common type of program in the smaller school is the general shop program. Several industrial areas of activity are organized in a single shop, usually under one teacher. Often two or more areas may be offered simultaneously. This type of shop program is most effective in a one-teacher situation, as it furnishes a logical solution to the realization of a variety of goals and objectives.

When well planned and well organized, and under the direction of an alert teacher, the general shop program has proven effective in small school situations. Schools with enrollments up to 300 students usually employ the general shop program. It may be used in either junior or senior high school.

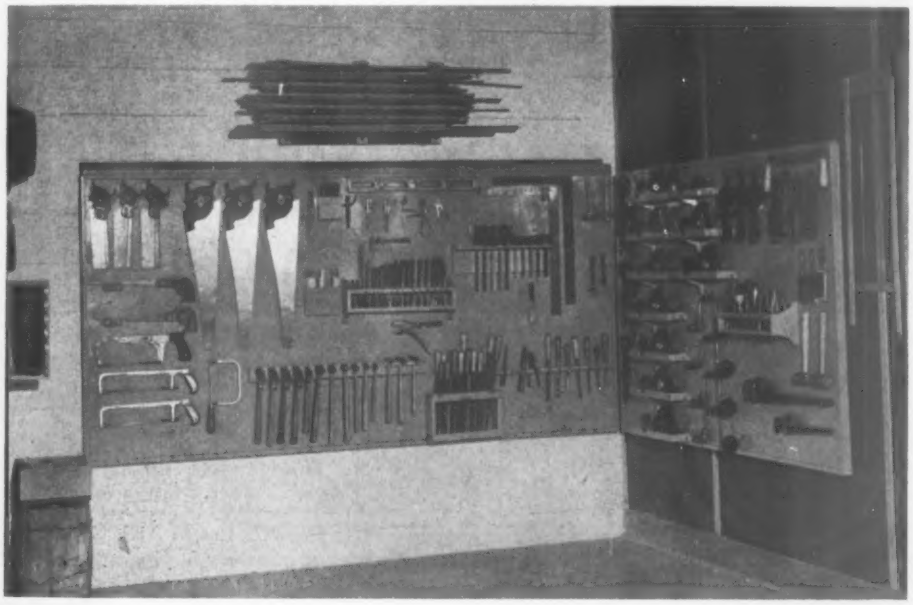
The Modified General Shop

In larger schools, where two or three teachers care for the department enrollment, two modified general shops may be provided. Each shop presents two areas of activity, with a resultant increase over the one-teacher general shop in the amount of time and space for each area of work. This plan provides an opportunity for better teaching than the one-teacher multi-activity shop, since the teaching situation is similar to that of the unit shop.

As an illustration, a school could schedule woodworking and drawing in one shop, and electricity and metalwork in another shop, with two teachers to present the program. Any other combination of areas would be as effective. This type of shop organization may be employed in junior or senior high schools with enrollments of 300–500 students.

The General Area Shop

In the general area shop several related phases of an industrial activity are presented, usually by one teacher. It has some of the characteristics of the general shop in that several phases of industrial activity may be in operation at the same time under one instructor. It has some of the characteristics of the unit shop in that it is limited to one general field of activity and offers opportunity for more specialized work.

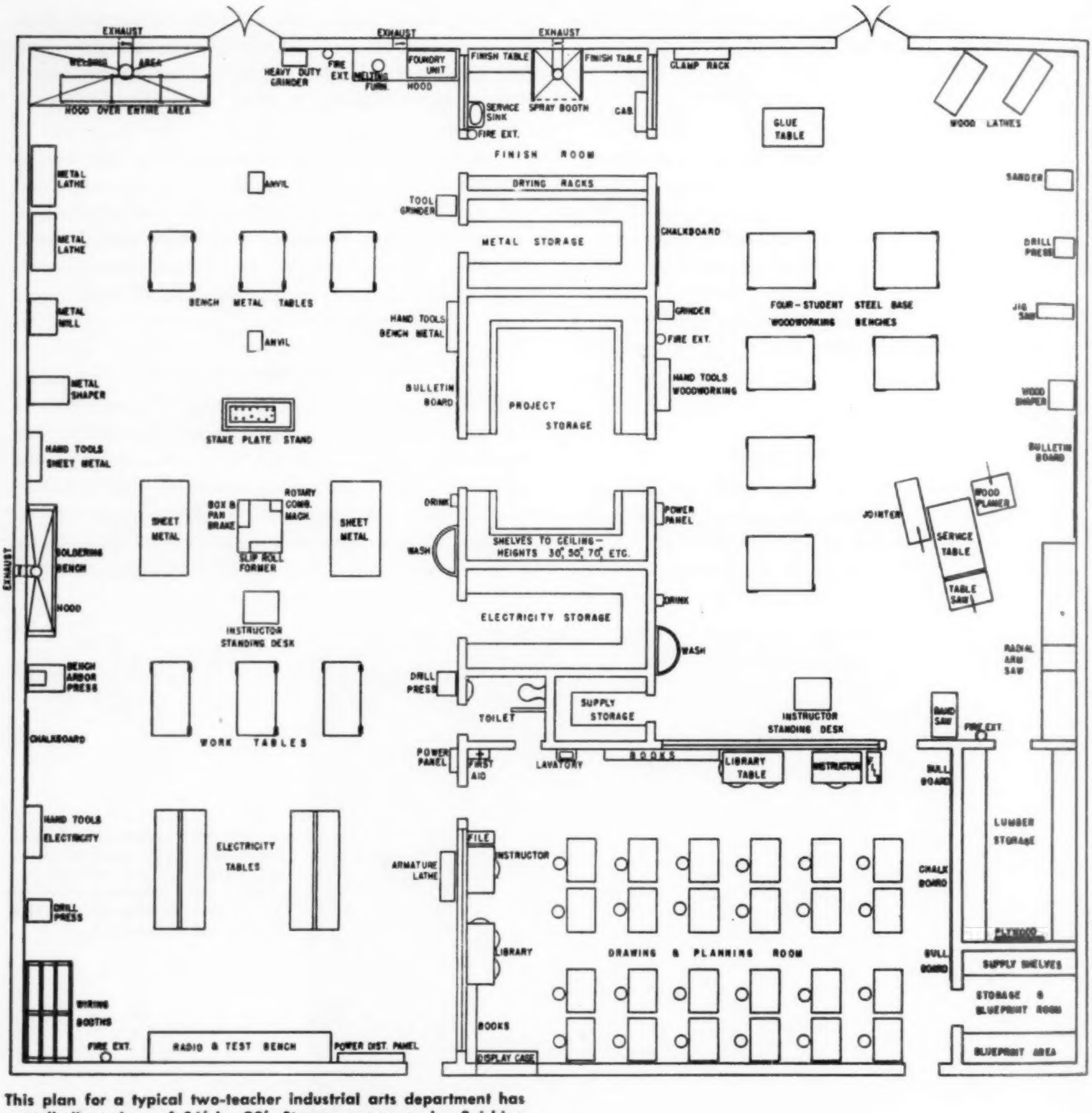


A neat, well arranged tool panel makes equipment easily accessible for students in the woodworking shop. Panel is placed low enough on the wall so that all items may be reached by pupils.

An example of such a shop would be the general metal shop in which work in sheet metals, art metal, bench metal, foundry, heat treating, forging, welding and machining metals may be presented. These are all phases of work in the metals field.

Development of the General Area Shop

The general area shop has developed from the unit shop as a result of the conviction that industrial education programs should be broadened and enriched beyond the earliest concepts. Greater contact by the student with related industrial areas will be more beneficial than complete specialization in a single activity shop. The general area shop is found in medium sized schools with enrollments of 500–1200 students and



This plan for a typical two-teacher industrial arts department has overall dimensions of 86′ by 90′. Storage spaces and a finishing room serve as buffer areas between the main sections.

where there may be a limitation on the number of teachers that can be employed.

Study the Community Need

An important aspect to consider when planning school shop facilities is the community need for industrial education training. This would include a study of the needs of junior or senior high school students, adults and tradesmen.

It is believed that boys and girls at the junior high school level have innate, native desires to express themselves through manipulative processes upon materials. This need is evidenced even in very young children by a fondness for building with blocks, finger painting, and "making things" from paper. At the junior high school level, curiosity about new materials to work with, new tools to manipulate, and new ways to do things calls for and finds expression in the industrial arts program.

The many changing interests which these children have and their comparatively short span of attention on any single activity seems to indicate that a broad, somewhat varied program should be chosen from the gamut of handicrafts activities. There should be some limitation on the number of areas to be included in the program. Perhaps no less than four and not over six areas of craft work should be included in any single year.

Crafts such as model building, woodcraft, metal-

craft, bicycle repair, plastics, leather, Keene cement, silk screen, linoleum block printing, wood carving, weaving, basketry, etc., may be chosen as the basic offerings of the program. Girls, as well as boys, participate in this type of program, and they frequently excel the boys in shop performance.

Apply Industrial Methods

At the high school level, the needs of the students for industrial education experiences grow out of the realization that they are an increasingly important part of the humming, bustling industrial world in which they live. Once-limited horizons are lifted, curiosities are aroused, and a new desire is created to know about and understand the industrial world.

Instruction should be offered in the most common industrial activities found in the community. Mechanical drawing, electricity, power and transportation, graphic arts, metalwork and woodwork can be realistically set up and presented to students in a situation which resembles that of industry. These experiences provide a depth of understanding of industrial methods and their relationship to the people. The shop program then becomes significant and meaningful.

It is wise for the shop program planner to consider the local community in relation to its industrial establishments and related employment opportunities. Suppose the community has a china factory and employs a number of local people. The ceramics industry should then be represented in the local school industrial arts program by providing instruction in ceramics. In another community, an iron foundry employs about forty local men and it represents perhaps the largest single business in the community. It would be only logical that the local industrial arts program include work in foundry procedures.

Consider Adult Education Needs

Careful note should be taken of the needs of adults in the community as well as those of school children. The school is becoming more and more a facility for the whole population, regardless of sex or age. Every effort is made in many communities to have the school serve the needs of adults as well as it does those of boys and girls. An expensive school plant should be used beyond the six-hour school day by the adults of the community. The trend is definitely toward evening schools for adults, both for self improvement and for the acquisition or extension of trade skills.

No part of the school program offers greater possibilities for adult education than does the industrial education department. Courses in upholstery, cabinet making, carpentry, concrete work, welding, drafting, electricity, printing, plastics, leather and many others are found in operation throughout the school year. These courses are designed to encourage hobbies, to improve consumer knowledge and information, to provide opportunities to develop some skill in handling tools and machines, to teach shop safety, and to encourage better methods and techniques of home repair and maintenance.

The modern architecture and functional design used at the Bloom Township High School are typical of the many new facilities for industrial education now being built throughout the State of Illinois.

A valuable by-product of these courses is improved public relations which results from first hand knowledge of the school and its operation. In planning an adult education program, adequate shop floor space, properly located and well organized project storage space, increased space for storage of materials, and capable shop tools and machinery must be provided.

Local tradesmen may utilize school shop facilities for trade extension programs. These programs are school-sponsored courses, taught by recognized tradesmen to help people already engaged in a vocation to become better workers and to upgrade their status as craftsmen in chosen trades. Such courses may require added school shop space, although they usually emphasize the related instruction phase of the trade and, therefore, need classroom facilities rather than shop facilities.

Present and Future Enrollments

Serious mistakes in school planning can be prevented when proper consideration is given to present

and future school growth. This is especially true in the industrial education department where shop space is the limiting factor. Since most new school buildings will be used for twenty-five years or more, every attempt should be made by the shop planner to peer as far into the future as statistics will permit. Future enrollments should be estimated to help visualize the future size of the school. With this information, even though it may be prognostic, the teacher or administrator can determine the number and size of shops fairly accurately.

The Funds Available

The factor which may affect school shop planning more than any other is the adequacy of funds for building purposes. The teacher or administrator should take the time to inform himself and other planners of the needs to be met. School boards and architects are not adverse to allotting a fair share of the total building cost to the industrial education department, once they understand the functions to be provided.

The shop planner should not be extravagant in his presentation of needs for facilities, neither should he be timid about asking for adequate building provisions. The tendency in the past has been to ask for too little, rather than too much, for the industrial education department.

If costs must be cut, there are always items which can be substituted or left out without affecting the function of the shop. For example, painted concrete block walls serve as well functionally as glazed tile. Concrete floors may be used instead of wood block in wood or metal shops. Caution should be exercised to see that space provisions and other facilities which affect the function of the shop are not cut.

Should the financial stress be so great that an adequate number of shops cannot be included in the original building, it is wise to provide those shops most needed. However, provision should be made in the plan for future shops to be added at a later time.

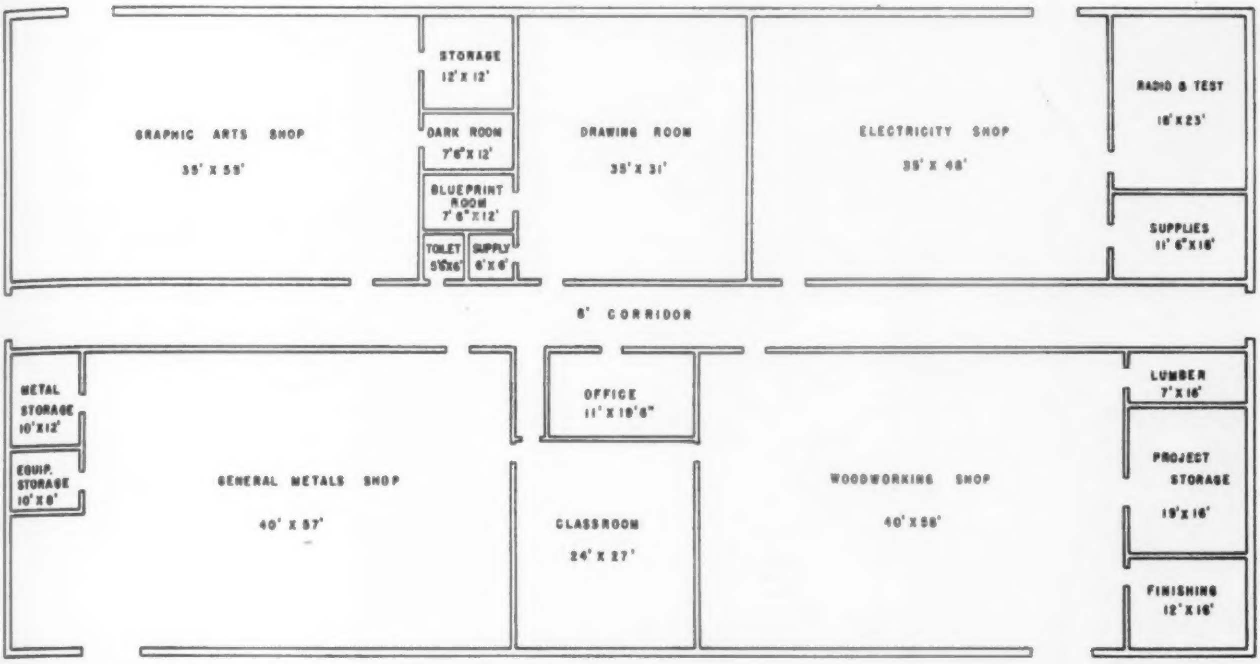
Extent of the Program

The extent of the industrial education program determines, to a great degree, the size and type of shop facilities to be provided. Some schools offer only a seventh and eighth grade crafts program. Others offer one or two years of industrial arts in the high school. Still others may offer six or even more years of instruction, including vocational industrial classes.

While there is no set rule as to how much industrial arts to offer, it would seem logical and wise to provide one year of instruction each in the seventh and eighth grades, and as many years of industrial arts and industrial vocational education in the high school as circumstances and other limitations permit. Certainly, exploratory courses in industrial arts should be provided for the first years of instruction, to be followed by semester tryout courses at the intermediate level, and by full year advanced courses at the junior-senior level.

As mentioned earlier, courses in adult industrial education should also be a part of the total program. These courses would include hobby type industrial arts

The tool foreman has the responsibility to see that tools and equipment assigned to him are properly accounted for and stored in the right place.



A multi-teacher industrial arts department, such as shown above (size 86' by 168'6"), may consist of graphic arts, metals, electricity, woodworking, etc.

classes and vocational trade extension work for tradesmen.

Implications Are Evident

The specific implications between shop planning and extent of the program are evident. Every school housing grades 7–12 should have at least one shop to accommodate students in grades 7, 8 and 9, and another for students in grades 10, 11 and 12. In small schools the two groups may receive instruction in the same shop, when the appropriate equipment and spaces are provided. In larger schools, the higher enrollment would justify more shops, more equipment, and a more extensive program.

Selection of Facilities

The program of industrial education determines, to a large extent, the type of shop facilities for a school. The term "facilities" refers to the housing accommodations. It includes such considerations as whether the school should build a one teacher general shop, two general shops, two unit shops, three or more unit shops, vocational shops or some combination of these shops. "Program" refers to the areas to be offered, the extent of instruction in each area, and the sequence of courses to be included.

It should be kept in mind that the program is to be determined first, and that this can only be done wisely when the needs of the program are the basis for determination.

Ratio Between Enrollment and Number of Shops

Some states have set up an acceptable ratio between school enrollment and the number of shops to be provided. One such recommendation is released by the State of California,* as follows:

School Enrollment	Number and Type of Shops
0-250	*One shop* 1. Drafting, electricity-radio, metal and wood, combined.
250-500	*Two shops* 1. Metal 2. Wood Note: Courses in drafting would be provided in classroom facilities. Activities in electricity-radio may be introduced in the metal shop.
500-750	*Three shops* 1. Metal 2. Wood 3. Auto mechanics and auto essentials Note: Courses in drafting would be provided in classroom facilities. Activities in electricity-radio may be introduced in the metal shop.
750-1000	*Four shops* 1. Auto mechanics and auto essentials 2. Metal 3. Wood 4. Drafting Note: Activities in electricity-radio may be introduced in the metal shop and activities in graphic arts may be introduced in drafting.

* State of California, Department of Education: *Number and Types of Industrial Arts Shops Needed for Grades Seven to Twelve According to School Enrollment.*

James Israel

Midview High School, Grafton, Ohio, designed by Beiswenger, Hoch & White, architects, has a fully equipped industrial arts department.

1000-1250 *Five shops*

1. Auto mechanics and auto essentials
2. Drafting
3. Metal
4. Wood
5. Electricity-radio (Electronics)

Note: Activities in graphic arts may be introduced in drafting.

1250-1500 *Six shops*

1. Auto mechanics and auto essentials
2. Drafting
3. Electricity-radio (Electronics)
4. Metal
5. Wood
6. Graphic arts

1500-1750 *Seven shops*

1. Auto mechanics and auto essentials
2. Drafting
3. Electricity-radio (Electronics)
4. Graphic arts
5. Metal
6. Wood
7. Handicraft

1750-2000 *Eight shops*

1. Auto mechanics and auto essentials
2. Drafting
3. Electricity-radio (Electronics)
4. Graphic arts
5. Metal
6. Wood
7. Handicraft
8. Photography

Complicated printing press is handled competently by boys in the Sewanhaka High School, Floral Park, New York.

The shop teacher or school administrator, who succeeds in planning school shop facilities which meet the needs of a good program and which permit adequate shop instruction, will find a great deal of satisfaction in so doing. An early realization of the responsibility for well planned shops should be followed by consultation with state and local supervisors and teacher educators and frequent conferences with the architect.

With a sound determination of program needs, and a matching of shop needs with available funds, the problem of school shop planning should result in the provision of adequate space, proper room areas, well planned auxiliary facilities, good ventilation and lighting, and for possible future expansion. Such planning is sure to be rewarding as the smoothly functioning department bears evidence of a job well done.

UNUSUAL USEFUL ARTS BUILDING IN PRATT, KANSAS

by **DONALD R. LIDIKAY**

Superintendent of Schools, Pratt, Kansas

Born in Kansas, Mr. Lidikay graduated from Baker University and earned his M.A. in Education from the University of Kansas. He started his school career as a coach at Blue Mound; and has served as superintendent of schools in Bronson, Council Grove, Bonner Springs and Wakeeney, all in Kansas. This is his fourth year as superintendent at Pratt.

ON a sunny day last October, 1956, another pioneer's dream reached fruition—the handsome Walter Pedigo Useful Arts Building was dedicated at Pratt, Kansas.

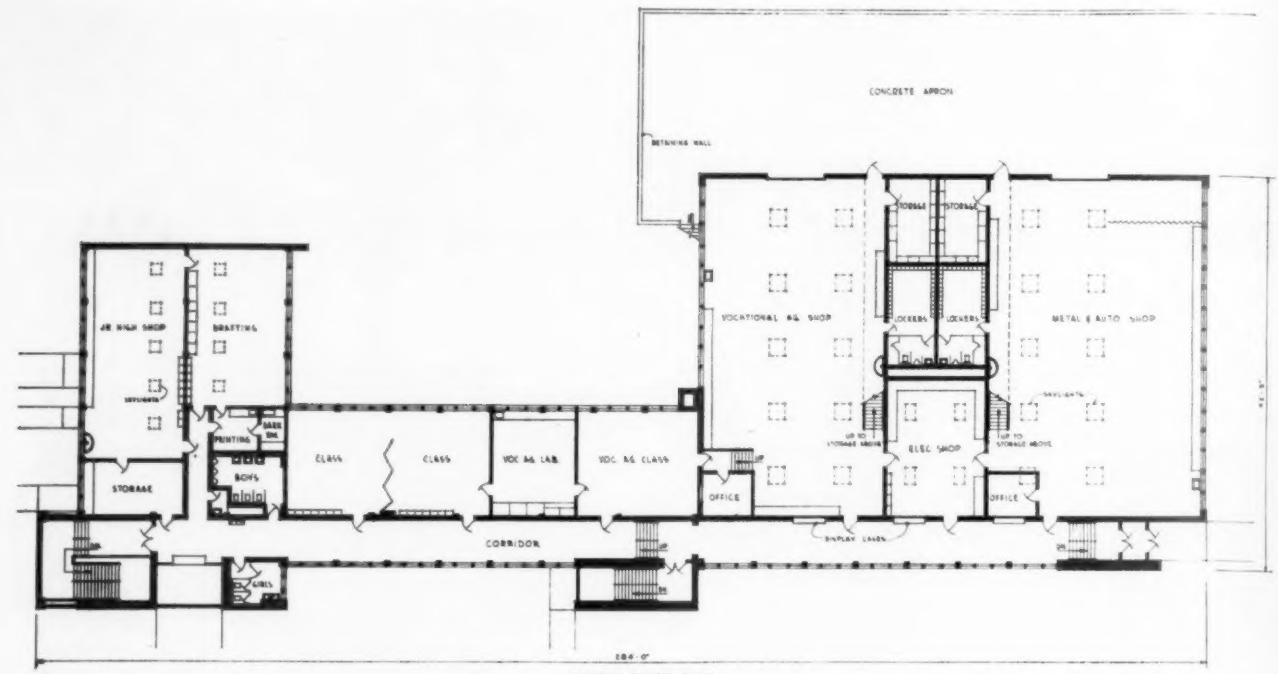
Named in honor of Walter Pedigo "who believed in the dignity of work and shared his success with the community in which he lived," the Useful Arts Building is a fitting monument to a citizen's belief in the importance of girls and boys—and the American Public School.

Walter Pedigo dreamed of the practical application of theories taught in the schoolroom. The construction of the unusual Useful Arts Building, through his generosity and interest, is a memorial to his idea that schools should provide a structure "where an appreciation of vocational pursuits can be acquired and a knowledge of crafts and trades obtained."

Mr. Pedigo died in 1951, leaving the bulk of his estate (to date, $520,000) to the board of education of the city of Pratt, Kansas, to be used to acquire or buy land for school purposes, or to construct permanent buildings or structures for school or educational purposes.

This fine brick building is of split level design. The north portion contains two classroom levels with the higher ceiling shops located on a third or in-between level in the south portion of the building. There are three regular classrooms; a vocational agriculture laboratory and classroom, junior high general shop room with storage and project rooms; mechanical and engineering drawing room complete with a blue print reading room

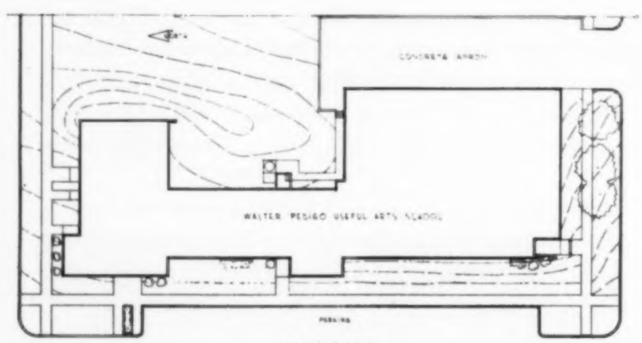
Architects Thomas, Harris and Calvin and Associates of Wichita designed the building.



SECOND FLOOR PLAN

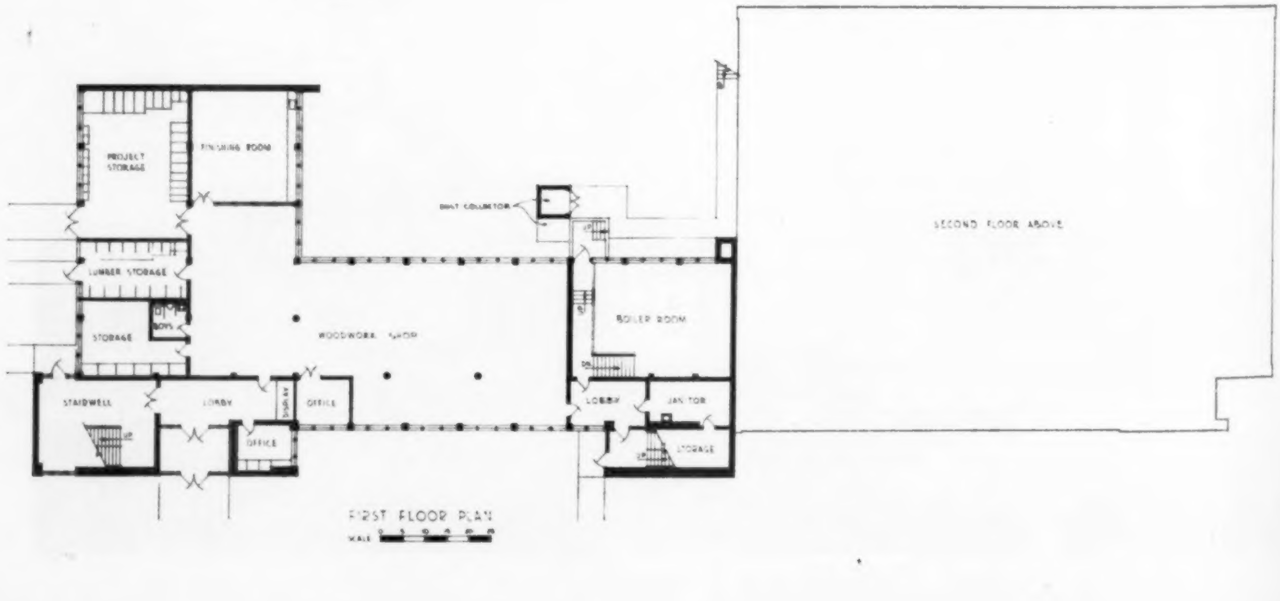
Second floor includes the junior high shop, drafting, printing, classrooms, vocational agriculture shop, laboratory and classroom, locker rooms, storage spaces, electricity shop and metal and auto shop.

and laboratory facilities; woodwork and carpentry room with two wood storage rooms; one project storage room and one finishing room; boiler room and custodial storage; vocational agriculture shop; large machine, motor and auto mechanics area and a multi-purpose electric shop room equipped for electrical instruction but which



PLOT PLAN

Site plan of the Walter Pedigo Useful Arts School is at left. Below is a plan for the first floor of the building. Areas here are the woodwork shop with auxiliary spaces—project storage, finishing room, lumber storage, general storage—and the boiler room and janitorial spaces.



FIRST FLOOR PLAN

The metal and auto shop has facilities for teaching machine, motor and auto mechanics. Electric outlets are located at frequent intervals along the wall at working height. Heavy testing equipment is portable.

can be used for classroom work. Each instructor has a glassed-in office next to his shop facilities. Cost of the building was $358,371 plus equipment and fees of $55,927, or an overall total of $414,298.

A Site With Restrictions

The cost per square foot was $12.06 at the letting held on May 6, 1955. The location of the building is across the street from the high school building and one block from the junior college, to enable joint use in a campus set-up. The site was restricted in size, with approximately a 12-foot difference in elevation from one end to the other. This was a challenge to the architects, Thomas-Harris-Calvin and Associates at Wichita, Kansas. They worked out a split level type plan, in which they were able to gain admittance to the large shop areas from grade at the high point on the site. The general classrooms and drawing rooms worked out well on the top level.

The breakdown of costs includes a general contract bid by Hahner-Foreman & Cale of Great Bend and Hutchinson, Kansas at $269,616. The local firm of Kimmel-Hoffman bid the electrical contract at $34,445. Another Pratt firm, Talbott Plumbing and Heating was successful with a bid of $54,500 for the mechanical work. American Cornice Works of Wichita, Kansas, installed the dust removal system for $3,869.

The two story section of the structure has reinforced concrete foundations, frame, floors and roof. The one story section has reinforced foundations and floors, but the frame is of structural steel with a long span bar joist roof. The exterior wall surfacing is of face brick and cut stone. Interiors of the building are face brick, lightweight concrete block and ceramic tile. The windows are steel sash.

Special equipment within the school includes the steel lockers, a dust elimination system, a car lift and the clock system.

Different Educational Approach

The Pedigo Useful Arts Building is neither an industrial arts nor a vocational arts structure in the usual sense. According to Superintendent Donald R. Lidikay, "We are operating on a general education concept as

The large dimensions of the woodworking shop add to the efficiency of the complete and modern equipment. Overhead pipe carries off dust from saws and power tools.

the term 'applied arts' building implies; some might call it an industrial arts approach. We believe that we are not in a trade community but we can certainly move in the direction of trades if we wish, because this building is functional. However, we are beginning our program with one and two-hour sessions to give more boys training which might be termed apprenticeships."

With a population of less than 9,000 people the city schools operate on a K-14 program. The enrollment of 325 junior college students in grades 13 and 14 comes from a 43-town trade area. The course offering provides for both college preparation and terminal training to enter the world of work. The rooms and facilities in the new building are functional in design so that a majority of areas could be readily converted to any type of teaching that may arise in the future, as well as to insure rugged durability and ease with economy of maintenance.

Facilities in the Project

The facilities included in the Walter Pedigo Useful Arts Building are as follows:

Woodworking Shop

1. Finish room, paint spray booth
2. Project storage room and classroom
3. Wood storage room
4. Instructors' storage
5. Instructors' office

Junior High Shop (a complete shop in limited character)

1. Main shop room
2. Storage room
3. Office

Engineering and Architectural Drawing

1. Drafting room
2. Printing room
3. Darkroom for photography

Vocational Agriculture Shop

1. Main shop area
2. Classroom
3. Laboratory
4. Office
5. Locker room
6. General storage room
7. Mezzanine storage

Metal and Auto Shop

1. Office

Seventh grade instruction begins here in the junior high shop. Students learn the rudiments of many kinds of tasks and become familiar with different equipment.

2. Locker room
3. Main shop area
4. General storage room
5. Mezzanine

Electric Shop (To serve also as a classroom for the auto and metal shop.)

Two general classrooms that could be converted by a movable partition to a large classroom or lecture hall.

Additional Facilities

1. Necessary restroom facilities
2. Janitor's facilities
3. Boiler room
4. Supervisor's office

Changes to Be Made

The room planned to include the automotive and machine shop space measures 52 feet by 79 feet, and presently houses the automotive classes and ninth grade general shop. The area is free of partitions, except for the shower, toilet and locker room facilities, and thus lends itself to flexibility. It appears now that the ninth grade shop will be moved to the junior high shop area, with the machine shop taking over their space.

A Versatile Classroom

Another flexible area is a two-classroom space with a folding partition. At present it is being used as two classrooms. However, the design is for a multiple-purpose use setup. Suppose a class is organized in one of the rooms in beauty shop operation. The course may attract an adequate enrollment for two years, and then fall off. The equipment could then be sold to one of the students. Perhaps the demand will arise for expanded facilities in electricity and electronics. The two rooms may then be thrown together, by opening the partition to provide a space of 48 feet by 24 feet, for this purpose.

A Multi-Purpose Room

There is a multi-purpose room between the two large shops which is currently used for beginning electricity. Also, the room serves for conferences and class work. Sometimes a part of the automotive class is brought in, away from the noise of the motors, while the remainder of the class works in the shop.

Because Pratt is a farming community the space for vocational agriculture is rather spacious. The shop meas-

ures 78 feet by 45 feet, with added area for tool storage, showers and lockers. The office, as in other shops, is glassed-in to permit better supervision of the outside areas.

Measuring 28 feet by 28 feet, the agriculture classroom provides adequate space for FFA activities as well as class work. Alongside is an agriculture laboratory which is used jointly by the high school and college classes.

In the woodwork and carpentry area will be found a dust elimination system, a project storage room with built-in cabinet space of varied sizes, lumber storage space and a finish room equipped with a modern paint spray booth.

The Program of Classes

As for the program of classes, 7th and 8th grade boys take a course which is called 'general shop' involving five stations—mechanical drawing, woodwork, electricity, sheet metal and plastics. Each boy moves from station to station and sometimes his project has natural continuity of required work in several shops.

For example, a student may draw plans for a table lamp, move to the woodwork station, turn out the lamp base, go to the electric station and install the cord and electrical parts, advance to the sheet metal table and construct a metal shade, and possibly finish at the plastics station by attaching a pull cord. If he wishes, the boy may continue on in the 9th grade, receiving a similar course in more advanced form. From there he may move in the direction of his greatest ability or need, into advanced woodwork, carpentry, electricity, general shop, auto mechanics, machine work or even agriculture.

Actually the shop program in the Pratt Schools is designed to serve the needs of grades seven through fourteen. Two programs are in force—the college preparation courses leading on to advanced engineering courses and the terminal courses leading directly into the world of work.

The new Pedigo Useful Arts Building provides a happy and stimulating setting for learning, as well as the facilities for academic and terminal courses.

Drawing tables, stools, lockers and supply cabinets constitute the main facilities of the mechanical and engineering drawing room of the school. Locked drawers hold students' rules and other supplies necessary for the tasks carried out.

Photos by Freund Studio

Elementary pupils enjoy the reading room at the University School, Florida State University, Tallahassee, Florida.

SCHOOL AND MULTI-SCHOOL INSTRUCTIONAL MATERIALS CENTERS

by AUDREY NEWMAN

Consultant, Instructional Materials, Florida State Department of Education

Miss Newman has a Master of Arts degree in Education and English from the University of Florida, Gainesville, and a Master of Science in Library Service from Florida State University. She has worked as a high school English teacher, high school librarian and as county library supervisor.

SETTING up instructional materials centers involves thorough understanding of the nature of such centers and knowledge of the school or area to be served. An instructional materials center is a service unit for housing, organizing, distributing, using and producing materials to be shared by schools. If schools could afford to equip all classrooms with the books, maps, pamphlets, films, filmstrips, recordings and other materials and equipment needed by teachers and pupils, if teachers had the time and training for organizing these materials and equipment, there would be no need for the center or for personnel trained in handling the materials.

Planning an instructional materials center involves basic understanding of the materials, equipment and resources necessary to implement a good school program. First, school personnel determine their objectives. Then they determine the services, materials and equipment needed on a sharing basis. Such sharing might involve an individual school or a group of schools. Often it is expedient for city or county systems to supplement materials and equipment in school centers with expensive items, such as films and large models.

Policies, services and activities should be determined cooperatively by teachers, materials specialists and administrators. After school personnel have determined the use of a center, they can work with architects in designing facilities for the particular needs of the school or system of schools. Questions such as the following should be ever before the teachers, administrators, architects and materials personnel as they plan together:

1. Who and how many will use the center?
2. When will they use it?
3. What materials and equipment will they share?
4. For what activities will they use the center?

Monroe County Materials Center, Key West, Florida, supplements school centers with material and equipment of all types.

5. What are the possibilities for future growth?
6. Approximately how many years will the center be used?
7. Have areas and facilities been designed for efficient use?

Instructional materials centers are somewhat alike in general characteristics. In particular characteristics, they are as personal to a given school or area as the dress mother makes with loving care for her teen-age daughter's first formal dance. The instructional materials center should be tailored to fit the group which will use it.

Although the centers have characteristics to comply with their specific areas, they also have many common aspects. Recently, a committee appointed by the Florida State Department of Education compiled a brief guide entitled *Planning Materials Centers*. After studying national and state standards, after examining their own experiences in planning and using materials centers, the committee had mimeographed a description of areas and equipment considered basic to planning.

Suggestions for the Centers

The mimeographed or tentative bulletin was then criticized, largely through personal interview, by at least fifty persons closely involved in planning and using instructional materials centers. After receiving constructive criticism from a group including architects, materials personnel, superintendents, principals and university and State Department of Education personnel, the committee completed the summary of basic facilities and suggested equipment, for publication during 1958. The following suggestions include committee recommendations for areas, space and location only.

Materials Centers in Schools

The materials center is essential for all students and must occupy an area of maximum accessibility. This means that it will be centrally located, whether in a school building or within the district. Let us consider first the materials center for an individual school.

While not necessarily in the center of the building, the materials unit should be near the focal point of inter-class traffic. If there is a study hall, the materials center should be adjacent to it. The selected location will be a quiet part of the school where there is a minimum of noise.

The area will be suitably proportioned to accommodate functional and aesthetic quarters. A first floor materials center is preferred, with expansion possibilities. A double-door entrance will lead into the main

reading area and a single outside entrance (to the corridor or to the outside of the building) leads to the work-storage area.

The Reading Room

The reading room is a necessary part of the instructional materials center. The activities taking place here are reading and browsing, individual or group reference work and circulation—checking materials in and out.

Library books, supplementary textbooks, teachers' professional collection, magazines, newspapers, pamphlets and some audio-visual aids are housed here. Audio-visual materials may also be housed in the audio-visual storage and workroom. There are facilities for displays and exhibits, teaching use of the library to groups and individuals, and listening to recordings, if listening tables are provided.

All elementary school materials centers designed to be administered by one librarian should be planned to accommodate the largest class (about 35 pupils) plus 20, allowing 25 to 30 square feet per person. However, when the expected enrollment for a new school exceeds 500 pupils, it will be necessary to allocate space and plan larger facilities to accommodate the increased materials and equipment needed.

In secondary schools this area should seat 15 percent of the first 500 pupils and 10 percent of the additional enrollment, allowing 25 to 30 square feet per seated user. The minimum provision of space is for 48 seated users. No single reading area should be planned

Secondary school students find a variety of interesting material in reading room of the University School, Florida State University.

to house more than 60 seated users. Multiple reading areas (not necessarily separate rooms) should be provided when more than 60 pupils will be using the facilities.

In twelve-grade schools the minimum space would accommodate 60 seated users. The maximum space would be for 75, allowing 25 to 30 square feet per seated user.

Conference Room or Rooms

A conference room or rooms will also be provided in the instructional materials center. The main activities here are conferences, small group work, previewing

A special class is using facilities in the materials center at the Douglass School in Key West, Florida.

films and filmstrips, and listening to recordings in small groups.

A minimum of 140 square feet is required for each conference area. Larger schools may have two or more conference rooms. One of these should be rectangular, 160 to 180 square feet, preferably long and narrow, sound and light controlled, for viewing films and filmstrips. Where more than one conference room is planned, it may be desirable to use folding partitions between conference rooms.

The conference room will be adjacent to and have direct access to the reading room. A clear glass partition on the wall between the conference and reading areas, from 3′ 4″ above floor level to a height of 6′, with adequate ventilation, will add to the efficiency and appearance of both rooms.

Work-Storage Area

The work-storage area may be one room or two separate spaces. Here materials and equipment will be received and unpacked. Materials will be prepared for circulation—pasting, lettering, lacquering, etc. Books are mended and bulletin board and display preparations are made. Magazines, house supplies and professional aids are stored in the room.

The combined work and storage room should have a minimum of 300 square feet of area. It will be next to the reading room and have direct access to it and to the audio-visual sections. If a ceiling-height wall separates the work area from the reading area, it should contain a clear glass partition from 3′ 4″ above floor level to a height of 6′.

Audio-Visual Storage Areas

The audio-visual equipment and materials storage room will contain most audio-visual materials—filmstrips, films, slides, records, disc and tape recordings, maps, charts, globes, display materials—and any other items to be shared among classrooms. Audio-visual equipment is also stored in this room—motion picture projectors, filmstrip projectors, record players, tape recorders, screens—as well as supplies for this equipment.

The activities taking place here include processing of new materials, inspecting and repairing of materials, previewing films and filmstrips, listening to recordings, and teaching projectionists the care and use of equipment. A minimum of 200 square feet of area is needed for the audio-visual room. If used for previewing, it should be a long, narrow room.

In very small schools it may be necessary to store audio-visual equipment in the work-storage area, adding a suitable amount of space according to material to be housed. The room should open into the work area. An outside entrance to the corridor or to the outside of the building will mean that the audio-visual equipment can be taken easily in and out of the storage area.

Office for the Materials Center

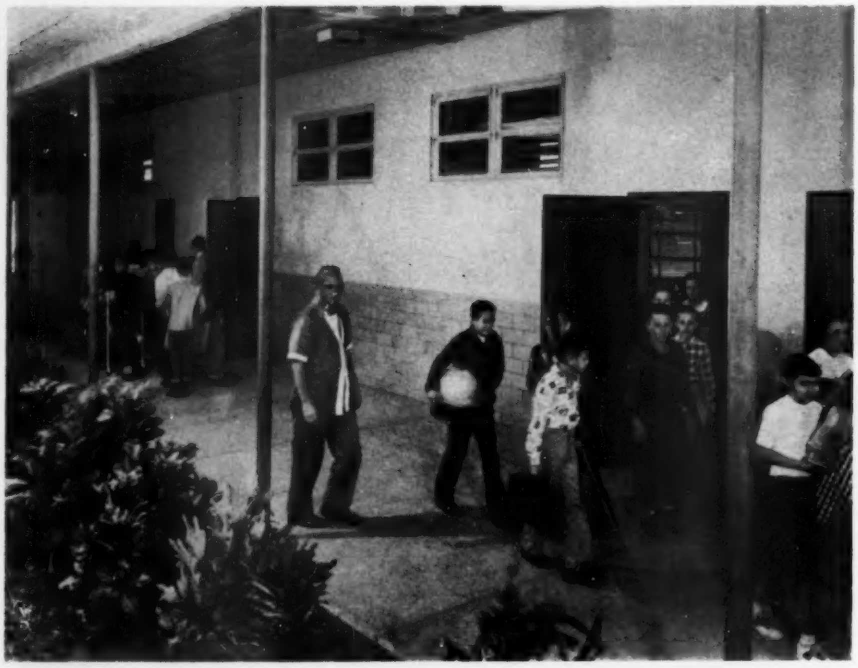
The office of the instructional materials center may be combined with the work and storage area and will

Reading room of the Key West High School, facing the circulation desk area.

Liddle & Kohn

Elementary pupils in the Miami, Florida, public schools have access to all types of materials and equipment in the school materials centers.

Students at the Florida State University School use the bulletin boards in the materials center to display their special projects.



Printed and audio-visual materials and equipment are circulated from the instructional materials center at the Largo Elementary School, Largo, Florida. Students are shown in the process of carrying borrowed materials to their classrooms.

be necessary only in the secondary schools. Office activities include making up new orders, checking in new materials and supplies, cataloging materials and typing orders, cards for the catalog and other records.

A minimum of 120 square feet of area is required for the office. In small materials centers, the office may be combined with the work-storage area with a total space minimum of 370 square feet. The office should have convenient access both to the work area and the reading room. Clear glass partitions in walls between this area and all other areas in the materials center facilitate supervision.

Photographic Darkroom

A photographic darkroom will be used for the study of photography, teacher and pupil production of graphic

Conference room at the Truman Elementary School in Key West is used by small groups for many purposes.

Resources of the materials center at the Miami Shores Elementary School, Miami, Florida, have been utilized for projects carried out by the students. The project illustrated here was developed to demonstrate the material available at the center.

and photographic materials and for student publications. At least 100 square feet are needed for the darkroom, preferably in a square shape.

The darkroom should be easily accessible to all groups desiring to use it. It is adjacent to the department that is to assume responsibility for its use. It may be next to the materials center, the science department, the industrial arts department or any other related area.

Remodeled Quarters

Designing quarters for a materials center from space not originally intended for these facilities requires ingenuity and planning in terms of available resources. Therefore, each renovation is unique.

In making plans for renovating, two steps are necessary: first, consider the recommendations for adequate quarters and equipment as outlined in plans for new buildings for the same type school. Second, implement and adapt plans in terms of the space and other facilities that are available.

Multi-School Materials Centers

The individual school materials center cannot satisfy all the needs for instructional materials. Therefore, a central materials collection serving a group of schools is a satisfactory arrangement. In Florida, a central collection serves a county school system. This system-wide materials center could supplement the services provided in the individual schools with a film library and a professional library.

The multi-school center could also include supplementary and exhibit collections of filmstrips, slides, recordings, sample copies of trade books and textbooks, and other materials and equipment. Facilities for the production of graphic and photographic materials might be desirable to include in new building plans for a county or area materials center.

The physical facilities of the county materials center would depend upon the kinds of services to be offered, the materials to be housed and the number of schools to be served. The county materials center should

be located where it is convenient for use by the instructional personnel—teachers, administrators and instructional supervisors. If there is a county school administrative building or buildings, it is desirable to have the materials center in the same area.

In general, the county materials center serves the staffs of all the schools in the same manner that the materials center in the individual school serves its staff and pupil personnel. Space similar to that in individual school centers is a requisite for the county center. The size will be determined by the extent of the services to be offered, the volume of materials and equipment to be housed, and the number of schools and of instructional personnel.

Classroom collections may be borrowed from the materials center.

Ulric Meisel

Provide for each type of material and equipment—professional library, films, filmstrips, slides, recordings, recording tapes, models, museum objects, vertical file material, projectors, screens, etc. The size of the area needed for this purpose will, of course, depend on the quantity of material to be housed.

Distributing the Materials

Distribution of materials is one of the main functions of the county materials center. This involves booking, shipping and repairing. Booking, or the scheduling of materials, requires office and desk space according to the size of the center and the system used.

Packing and shipping are especially important functions. Storage facilities are needed in this area for shipping cases, boxes, etc. Some centers place packaged materials in mail bags to be delivered by truck or school bus, some use the U.S. Mail, and others have materials picked up by individuals coming to the center. These activities necessitate adequate provision for parking space in the school administrative area.

Other Service Areas

Space is also needed where materials may be repaired, especially films. There should be a room where previewing and auditioning may be carried out by individual teachers or small groups. Conference rooms for small or large groups should be planned. Offices and work areas will help the professional and clerical staff administer the center effectively. If graphic and photographic materials are to be produced locally, space should be provided where the production facilities may be used and stored.

Whether serving an individual school building or a whole school system, the instructional materials center will function best under the favorable combination of a good location, adequate spaces and areas planned according to use. The result is a materials center which serves its district efficiently and which responds promptly to any call from the schools.

ADMINISTRATION BUILDING FOR A NEW SCHOOL DISTRICT

by J. EVERETT LIGHT

Superintendent, Metropolitan School District of Washington Township, Marion County, Indiana

Mr. Light was graduated from Ball State Teachers College and received his master's degree from Columbia University. He has also done graduate work. Mr. Light was an assistant professor at Teachers College of Connecticut and later served on a state advisory committee. He was superintendent of the Rushville City Schools for ten years before accepting his present position two years ago.

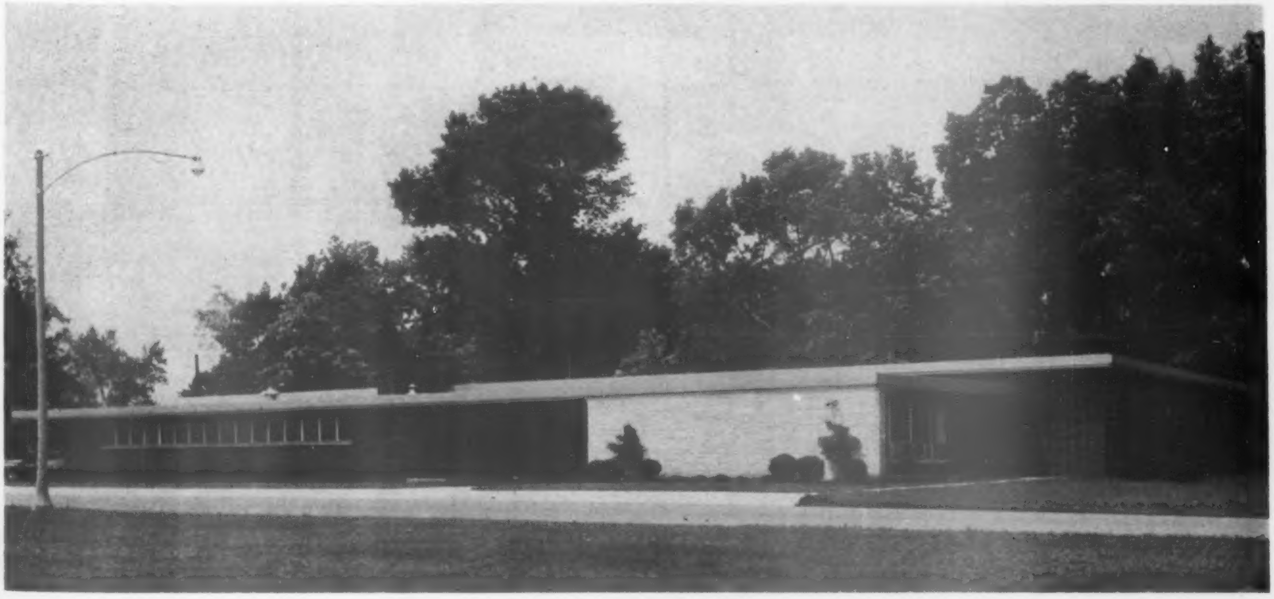
On August 1, 1955, the Metropolitan School District of Washington Township, Marion County, Indiana, was organized and a school board form of government became effective. The new school board, as its first act, hired a superintendent of schools. It was found that there was no room for general administrative offices in any existing school building, and no specific room was provided in the additions and new buildings contemplated.

The board of education took its responsibility seriously and, after careful consideration, decided that the district needed a building to house the new general administration staff. There was also an immediate need for additional classrooms close to the Nora Grade School.

The Nora Grade School grounds comprise about three acres, but they are adjacent to 103 acres recently purchased for a new high school and additional school facilities. The board's proposal was to build an administration building with rooms which could be used temporarily as classrooms and which could be converted later for administrative purposes. It was decided to locate the building on a part of the 103 acres adjacent to the Nora School.

A building was designed with five 27′ x 32′ classrooms, a combination superintendent's office and board

Administration building was designed by the firm of Everett I. Brown Company, Indianapolis.



The new administration building for the Metropolitan School District of Washington County was located on part of a 103 acre site recently purchased for a new high school.

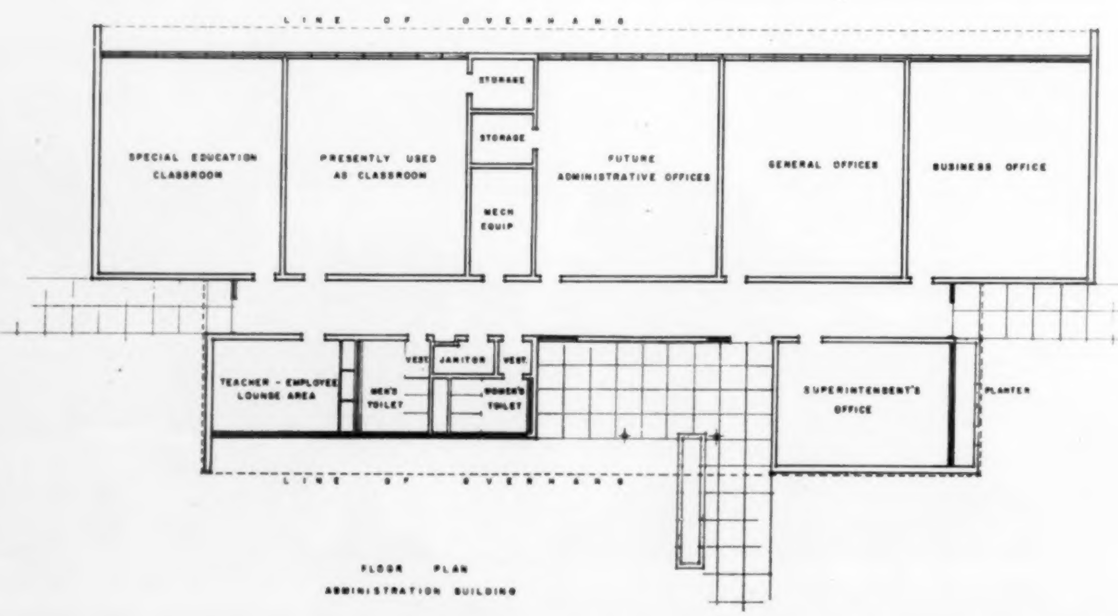
room with the necessary utilities and a teachers' or employees' lounge room. Immediately, one of the rooms was set up as a business office and the four remaining classrooms were used for elementary grades.

As additional facilities became available in the fall of 1956 for classrooms, the second room was assigned as an administrative office space. This centrally located office houses the director of transportation, the director of food services, the superintendent of buildings and grounds, and the speech and hearing therapist (or director of special education), together with necessary space for secretarial help and storage of records.

Complex Transportation System

The director of transportation needs a great deal of space for map layout and bus routing. The Metropolitan School District of Washington Township, where all pupils are transported, has a complicated maze of bus routes and scheduling. There are 47 buses that range in occupancy from 48-passenger to 73-passenger ve-

Facilities within the building consist of the superintendent's office, general and business offices, a lounge area, space for future offices, and two classrooms.



The business office of the administration building has accommodations for the business director of the school district, a secretary, bookkeeper and a clerk.

In the general office the director of special education and the superintendent of buildings and grounds have their headquarters. Secretaries complete the working force.

The superintendent's office also serves as the board room. A table and chairs for board meetings and conferences are at the right. A secretary's desk is also located in this office.

hicles. These buses scatter out over the community and pick up all junior and senior high school students in the morning, delivering them to their respective buildings.

They then cover the community a second time to pick up all elementary youngsters in grades one through six, and have them at their buildings by 8:40. Including shuttle runs between the junior and senior high school and counting both morning and evening transportation, there are 264 loads of school youngsters picked up and delivered each school day.

Community Is Growing

We now have an administration building that is filling the needs of a rapidly growing community in which the general school administration setup is in its infancy. The business director's office, of course, handles all purchasing together with payroll, bookkeeping and accounting procedures. The administration building is located centrally in the school district.

During the past school year the building has housed one overflow class from the Nora Grade School and has devoted one room to special education for the educable and trainable youngsters who are brought in by station wagon from throughout the school district. As additional general staff members are added there will be ample office space in the new building.

In the future, the administration hopes to make one room available for community functions and to have this room open constantly for committee meetings, citizens planning groups, parent-teacher council meetings, and any small meetings of 100 people or less that usu-

ally convene in a school building. Such meetings could take place in the administration building rather than open a large school building. The administrative center has already become the center of activity for general community planning. The building is used many nights of the week for various community activities and meetings.

Architecture Is Modern

The administration building is modern in design, easily accessible and has a permanent type construction. The exterior is a combination of brick veneer and stone, with aluminum windows and marble window sills. Room partitions are steel, studs and lath with plaster throughout.

The interior hall has one wall of brick and glass, the same as the outside. The other wall is finished with a plastic fabric covering that resembles wallpaper. This gives the area an informal, homey atmosphere that is most desirable for offices as well as classrooms.

Toilets are centrally located and easily accessible by students who might be occupying extra classrooms or by office and administrative workers. Floors throughout the building are concrete covered with asphalt tile. The color of the asphalt tile differs in each room and blends with the wall coloring. A solid one-piece ceiling is an acoustic success and the building, throughout, has fluorescent lighting.

Convenient Parking Areas

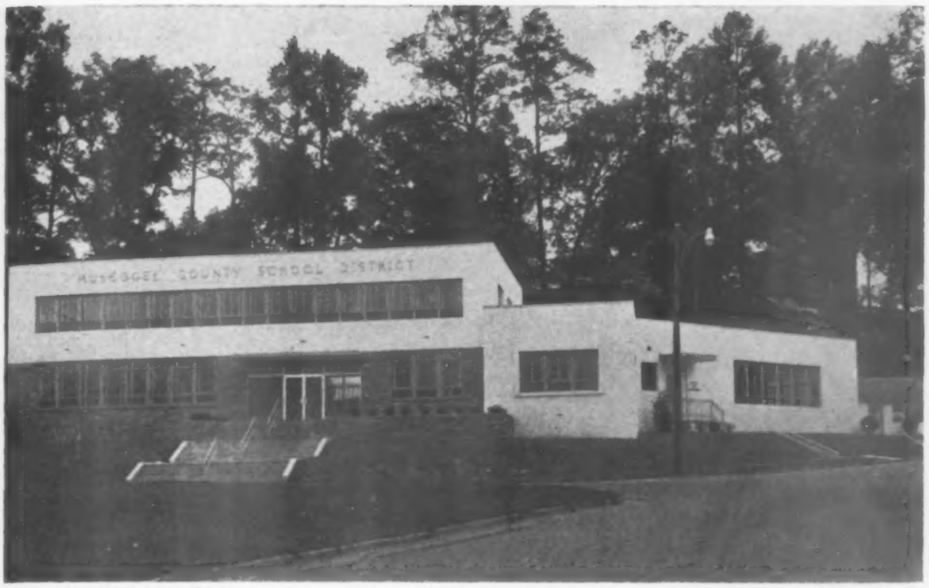
The main entrance of the building is approached from the blacktop road that runs past the structure to the parking lot at the new high school. The entrance has a pleasant and home-like appearance with its large open porch and planters. There are other entrances at the end of the hall on the north and south sides.

The blacktop parking lot next to the building, on the south, is used by employees, visitors and salesmen who have business within the administrative center. Outside lights illuminate both the building and the parking lot at night. The structure has a package-type, oil-fired boiler and is ventilated by a jet air system. The administrative rooms are individually air-conditioned by means of window units.

The director of transportation needs extensive space for posting maps of the bus routes of the school district. The district operates 47 school buses with 264 loads of school youngsters picked up and delivered each school day.

The Architectural Firm

The architects and engineers who designed the new administration building for the Metropolitan School District of Washington Township are the firm of Everett I. Brown Company, Indianapolis, Indiana.



Photos by Nechtman Studio

Designed by the firm of Jas. J. W. Biggers and T. Firth Lockwood, the administration building contains 11,197 square feet of usable floor space and cost $193,445. The building is completely air-conditioned.

MUSCOGEE COUNTY'S NEW ADMINISTRATION BUILDING

by NATHAN M. PATTERSON

Supervisor of Special Services, Muscogee County School District, Columbus, Georgia

Mr. Patterson has held his present post since the Muscogee County Schools and the Columbus Public Schools were merged in 1950. Prior to that time he was superintendent of the county schools. He completed his undergraduate college work at Berry College and University of Florida; and has an M.S. degree from Alabama Polytechnic Institute.

THE trend to larger administration units for public education has placed renewed emphasis on the value of the administrative organization. Rapid growth in school enrollments, combined with increased costs of education, has moved the matter of education into "big business," as far as money and operation are concerned.

Today, generally speaking, education represents a business equal to or surpassing the largest single industry found in a given community. This fact requires the local community to consider the value of establishing not only a professional staff, but also facilities to serve as headquarters for the board of education, the superintendent and his staff—including business affairs.

The Muscogee County School District Board of Education, under the leadership of its president, Walter A. Richards, and the Superintendent of Education, Wm. Henry Shaw, provided for administrative needs in planning a bond issue in June, 1950. The bond issue planning requirements set aside a sum of four and one-quarter million dollars for capital improvements. The board of education, acting immediately following passage of this issue, outlined the projects to be constructed in the order of priority as to the importance of each.

Three groups of projects were established. First, was the construction required in existing buildings to bring facilities up to standard. Second, was the purchase of sites and construction of new schools as planned. Third, was the expansion of existing downtown schools where additional facilities were needed.

A Building for Central Administration

Recognizing the great need for construction of additional classroom space, the board of education delayed the planning of a central administrative unit. Later, however, the architect was authorized to proceed with plans and specifications for a building to serve the needs of the board of education and all functions of the central administrative organization.

Jas. J. W. Biggers and T. Firth Lockwood, associated architects of Columbus, Georgia, were selected to design the building. Actual construction of the building

Lighting of the board of education meeting room is concealed in the building structure. The room is well ventilated and has separate controls for its air-conditioning system. The room has a separate outdoor entrance.

The library-conference room provides space for special conferences and is convenient to the board room and superintendent's office. Professional literature and student work are displayed here.

was begun on November 23, 1954, and the building was officially occupied on January 2, 1956.

Development of the new administration building gave school officials and the architect a chance to plan a central administrative unit in keeping with first, the contribution of such a building to the program of education in the community and next, the service of such a building to the general public. The idea incorporated in the latter point was to provide an opportunity for the community to meet together and plan with the professional staff on the problems of education.

Since the building was to be located on an undeveloped site, the architect was able to coordinate his design with existing physical characteristics and the natural beauty of the site. The area is located near the geographic center of the city of Columbus and Muscogee County. It is part of an educational center known locally as Bradley Memorial. This center contains approximately eight and one-half acres of land on which are located the existing Bradley Library (municipal library), Bradley Museum, and the Euphan Stewart Art Gallery. Around the four buildings are the landscaped gardens which make up a large part of the cultural value of this center. All these facilities are owned and operated by the board of education.

Structure of Two Levels

The administration building was oriented to face north, overlooking the intersection of two main thoroughfares in the city of Columbus. The terrain slopes from south to north, a natural setting for the development of a building designed with two levels, and in keeping with physical conditions of the existing landscape.

The front section of the building is of two story design, with a one story wing to the southwest. The wing houses the board of education meeting room, office of the superintendent, a foyer and toilet rooms. The board room accommodates a large T-shaped table surrounded by 21 chairs and space for at least 75 spectators. The room is designed for professional group meetings within the educational system, as well as supporting agencies in the community.

Adjoining the board room are the offices of the staff personnel. The superintendent's office has direct access to the main building; this permits the superintendent and his staff to work together at all times.

For regular meetings of the board of education, professional meetings during the work day, and gatherings at night, the board room may be reached from the outside by an entrance at Bradley Drive. Groups in session have access to telephone, toilet facilities and closet space. This area, including all facilities, may be closed off entirely by double doors, and the board room proper may be sectioned off by the use of folding doors.

Library-Conference Room

The library-conference room is near the superintendent's office. The room has a large round table surrounded by captain's chairs for conference purposes. There are shelves on one side where books and periodicals carrying the latest information on education are kept, along with scrap books and individual school information folders. Student science and art work displays, as well as other exhibits, are collected from the several schools and shown here. The walls of this and the board room are covered with gallery cloth and can be used as tackboard. Small groups may meet here with the board of education, superintendent or staff. A telephone and desk may be used without interference with other offices, as this room can be closed off from the main building.

To bring together the beauty of the surrounding grounds and the new building, the architects planned three inside gardens. The main stairway is undergirded by an L-shaped botanical setting. Steps leading to the second floor pass completely over this area, giving the effect of a bridge crossing over a garden. The setting is made more realistic by means of a large picture window here which frames the outdoors. The window actually forms the rear wall.

Above, John R. Kinnett Sr., board member, Superintendent Wm. Henry Shaw, and representative architect Edward Neal inspect plans for the building. Below, Walter A. Richards, board president, signs the building contract, flanked by the superintendent and attorney A. Edward Smith.

An Entrance Garden

One other garden is located at the main entrance of the building, on the right and left of the front door. These are twin gardens in movable boxes, and may be rearranged as often as desired. Panels on either side of the main entrance are glass, and the gardens may be viewed from the outside as well as being appreciated as inside decorations. Another planting area is located in the south window of the board room. The view from the board room window is across the garden and into a U-shaped formal terrace. The formal garden is framed by the building, wall and iron fence attached to the building, and is meshed properly into the fast changing contours of the landscape.

Business officials are located on the second floor, with other spaces for staff personnel. The bookkeeping space has been planned to handle all business machine operations. Next to this office is the receiving room where all monies are received from the several schools each day. The office of the treasurer is accessible to the main hallway. The treasurer is able to supervise the activities in the receiving room, the bookkeeping department and meet the public, from the same office.

Some Other Areas

The main hallway in the upstairs section leads to the south end of the building and ground level, permitting access to the second floor without travel through other sections of the building. Along the main hall of the second floor are several offices, toilet rooms and a work space. One area is set aside as a kitchenette for

Spacious main entrance has attractive planting boxes and stairway which leads to the second floor office areas.

Bookkeeping department has eight work stations. Built-in cabinets above filing units are for record storage.

Landing of the open stairway is framed by a picture window which looks out upon a garden arranged underneath the window and stairway portion of the building.

the convenience of the staff in preparing food at the noon hour. There is a conference room for small group meetings. A records vault adjoins the treasurer's office and a room for inactive files is situated near the rear entrance of the building.

Individual rooms are warmed or cooled by unit convectors, thermostatically controlled from each room. These units operate as part of a central plant.

Expansion Provisions Were Made

Expansion provisions were part of the original planning of the administration building. When more office space is needed, a third story can be added at minimum expense, since the structural requirements for this floor were included in the initial construction. An elevator shaft has been provided but at the present time it is sealed up, pending the expansion of facilities. Parking is adequate, but more space may be added later. The immediate area surrounding the building is not congested, since the building is located outside of the heavy downtown traffic area.

The architect studied the surrounding buildings and grounds and incorporated the most desirable characteristics of both in planning the new structure. The idea of service and utility value to the school system and the community were ever foremost in the development of this project.

As the building is approached, one is impressed by its simple beauty, combined with some of the best features of modern construction. To realize that this is a functional building, it is only necessary to enter the main door on the first floor. At the right is an information desk where all telephone calls are received and all visitors are welcomed. In addition, there is a directory listing all personnel and room locations in the building.

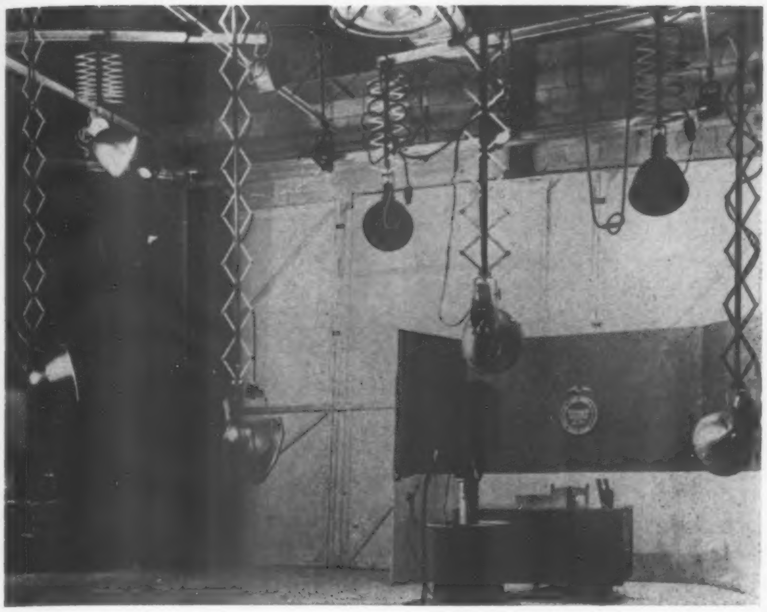
From here, there is direct access to the offices of all personnel on the first floor, and to the board of education. Directly in front of the main entrance and near the information desk is a stairway leading to the second floor. Once on the stairway one can see a number of the offices on the second floor as well as the attractive bulletin board where special announcements and other ideas are featured.

Business transactions in one office may be executed without interrupting other office personnel. The location of each office in relationship to the main hallway eliminates unnecessary traveling within the building.

Experience Proves Its Worth

Experience during the months the building has been occupied by the professional leaders in the school system has proved the value of an administrative headquarters building to the advancement of the educational program. All groups, the teachers and workers in the school system feel welcome in this building. They seem to have developed a pride in knowing that they have a place in which to meet and to work cooperatively with the central school office in developing the many aspects of the educational program with which they are connected.

Local citizens, having met in this building with the board of education, the superintendent and his staff, have indicated on many occasions the feeling that they have invested correctly in this building. They realize that its establishment guarantees, to a great extent, the enrichment of public education in Muscogee County.



Lights are in place and the stage is set for a TV broadcast. The mobilrail, light lifts and special lighting equipment are arranged for maximum clarity of viewing.

LIGHTING LAYOUTS FOR EDUCATIONAL TV

by NATHAN J. SONNENFELD

New York Sales Manager, Century Lighting, Inc., New York City

Mr. Sonnenfeld has participated in dramatic creative lighting endeavors since a young boy. From summer camp and high school and college interest in dramatic lighting he went on to become technical director of the 92nd Street "Y" in New York City. After four years of army service, Mr. Sonnenfeld accepted a position with his present firm. He participates actively in many large and small TV and theater projects.

IN television, education has a new and wonderful tool available. Much has been said for and against TV as a tool for education but we are sure that, used properly, educational television will prove to be a wonderful and exciting instrument for the educator. TV will neither replace nor elevate the teacher. The warmth and personality of the teacher will always be a necessary part of teaching.

Proper lighting for educational TV involves the closed-circuit classroom setup and broadcast TV. This writer firmly believes that professional standards must be used throughout. Working to professional standards does not mean using elaborate, complicated equipment; on the contrary, it means using proven, dependable apparatus. Professional equipment throughout means "getting the most for your money."

We have analyzed the cost of using "birdseye" and pin-up lamps versus using standard professional TV lighting equipment, and find that the savings are not worth it, just as using second hand building materials may prove to be an expensive practice in the long run.

We are faced, in educational TV, with the problem of holding the students' attention on a screen having a total area of 21″ x 15″ or 24″ x 18″. To do this, the instructor must have the power to attract and hold attention for a 30 or 40 minute period. The teacher must carefully select the script, material and manner of presentation. This is no problem for the qualified educator—he has been doing this very thing for years. What must be learned is how to adjust delivery and presentation to this new tool.

Now, since the teacher is one step removed from the student it is essential that the picture on the screen be sharp, bright and clear. All display and demonstration equipment and apparatus must be clearly visible. This involves having shadow as well as light, for the shadow of an object often tells us much about the object itself.

Considerations for Lighting

Lighting techniques for educational television must be adapted to the purposes and facilities involved. We must consider the program, the physical plant,

the budget, the available personnel and the big dream.

Listed below are the design considerations and equipment required to light properly the instruction area for closed-circuit or broadcast educational television.

Design considerations for closed-circuit educational television. For convenience it is assumed that:

1. The program requires two fixed sets.
2. The studio area is from 18′ x 25′ to 30′ x 30′ with a ceiling height of over 10′.
3. Movement of lighting equipment is kept to a minimum.
4. Picture quality meets educational standards.

Function of equipment. Three types of lighting instruments are employed, the 6″ and 8″ Fresnelites and the 18″ scoop. These have the basic functions respectively of back light, key light and base light. (Explanation of these terms and the general rules for television set lighting appear later.)

With the exception of one 18″ scoop on a castered stand, all the lights are hung from the ceiling on a mobilrail. This arrangement permits rapid shifting of light units without the use of ladders and extra personnel, and thus with maximum safety. Added flexibility is obtained by the use of lite-lifts for the simple, safe and rapid adjustment of the vertical position of two of the 18″ scoops. The scoop on a castered stand is invaluable for readily obtaining the required uniformity of base light and eliminating mike-boom shadows, and also provides a convenient source of light for an out-of-the-way chart or other demonstration device.

Power is distributed by junction boxes mounted on the ceiling. Power is controlled by a switchboard containing circuit breaker switches. Wall receptacles with 20-amp. outlets provide power for the floor units. For added safety, the lighting units are wired for a 3-wire, grounded system.

Installation. The installation of the junction boxes,

Lighting the Instruction Area

Quantity	Description
6	6″ 250-750-watt Fresnelite
6	500-watt lamp
2	8″ 1000-1500-watt Fresnelite
2	1500-watt lamp
2	4-way barn doors
5	18″ 750-2000-watt scoop
5	1500-watt lamp
5	Diffuser frame
2	7′ extension lite-lift, support 12-15 lbs.
2	18′ jumper cable
1	16″ three-legged castered stand
1	25′ jumper cable
4	4-way junction boxes, w/6′ pigtails
1	Wall receptacle, double 20 amp. for pin connector.
1	Junior mobilrail and carriers
	Switchboard, 16 ckt. breaker control panel

Equipment pictured above is the 750-2000-watt scoop, at left, and the 250-750-watt Fresnel light, at right.

switchboard, wall receptacle and mobilrail is a service which can be supplied by a local contractor.

Budget. The overall budget will necessarily determine the amount to be spent for equipment. Certainly, if funds are available it would be well to add dimmer controls, a castered stand, an 18″ scoop, a 6″ and 8″ Fresnelite and a lite-lift for each lighting instrument. If funds are extremely limited, savings may be made by eliminating the lite-lifts, barn doors, diffuser frames, and by substituting a less expensive method of hanging the units (by pipes or unistrut) and by using two-wire, ungrounded light units. All of this results in some sacrifice in quality of lighting, flexibility, time, number of personnel required and ease of operation.

Language of TV Lighting

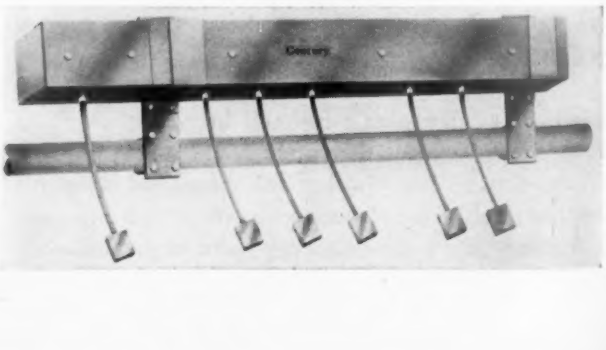
One of the tools of education is language. The language of TV lighting is simple:

Base light is that amount of light required for the camera to function properly.

Fill light is additional light to reduce shadow or minimize contrast.

Key light is the accent which gives the picture a dramatic and aesthetic quality. High key is generally used from one direction (i.e. left front) and low key from the opposite (i.e. right front).

Series connector strips, such as the one shown below, permit flexibility in mounting arrangements for TV lighting layouts.



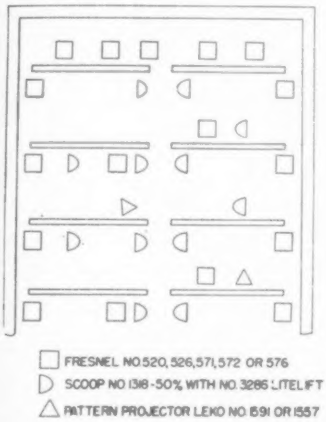
Back light is placed behind the subject and directed towards the camera. This adds the vital third dimension of depth to the subject.

Eye light from a low intensity spot gives sparkle to the subject's eyes and teeth.

Special effects lights vary from a crystal shower ball to a rear screen projector.

General Lighting Procedures

The standard lighting procedure should be: (a) to establish first a uniform overall base light which will ensure proper camera operating conditions for technically good quality pictures; and (b) then to add carefully balanced effects light to obtain the desired artistic results.



Partial plan of an initial lighting layout for a large studio. Equipment used includes Fresnel lights, scoops, litelifts and a pattern projector.

Base light should be obtained from large area diffuse sources arranged to produce a uniform illumination level throughout the set and from the viewpoint of all camera angles. The lighting levels required will depend upon the camera tube. For example, with a type 5820-image orthicon camera tube, a lighting intensity of 75 ± 10 lumens per square foot, measured in a horizontal plane, is usually satisfactory. The vertical light intensity should be less than (½ to 1 times) the horizontal intensity.

To provide depth, to separate objects and to add artistic interest to a picture, several types of effects lights should be added to the base light. Effects light may include key light, back light, modeling light, eye light and special effects light. In general, these are best supplied from directional sources (usually incandescent) which can be conveniently adjusted in intensity, character and coverage. Initial adjustments may be made with the aid of a photocell meter, but final judgments should be made on a picture monitor.

Back light should be directed from the lowest possible rear angle with intensity between 1 and 1½ times the base light level. The light meter should be pointed towards the source of back light for this measurement, and all other sources of light should be turned off. Vertical top light is not back light and is to be avoided.

Modeling light should be directed from a side-front position and may be adjusted in intensity just to produce shadows. In general the amount of light required will not exceed ½ to 1 times the base light intensity.

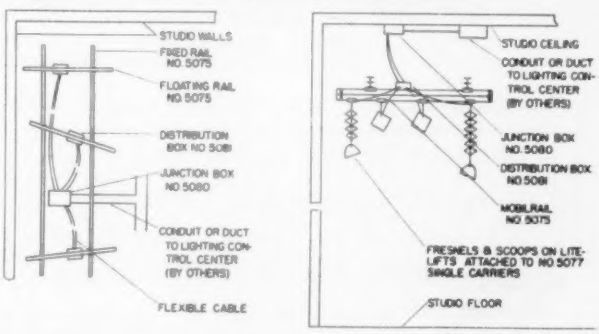
Key light, used to give the effect of a predominant source of light, may be from 1 to 2 times the base light level, with any base light from the same direction as the key light reduced accordingly.

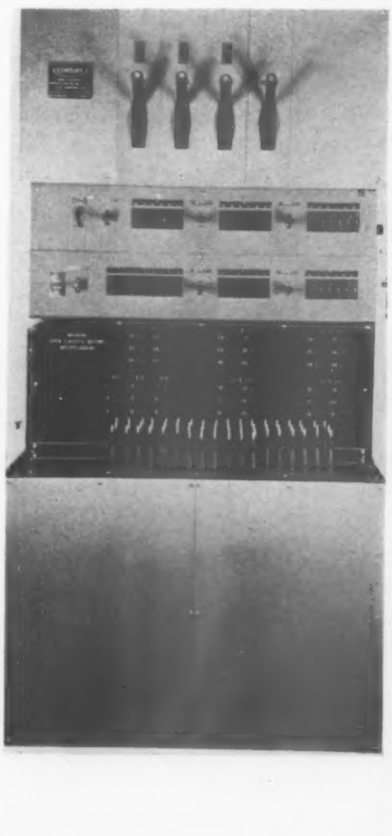
Eye light may be added to brighten up a performer's eyes and to supplement the base light on close-ups. A small spotlight, mounted on the front of the camera and having an intensity of not more than ½ to 1 times the base light, is useful for this application.

Special Lighting Effects

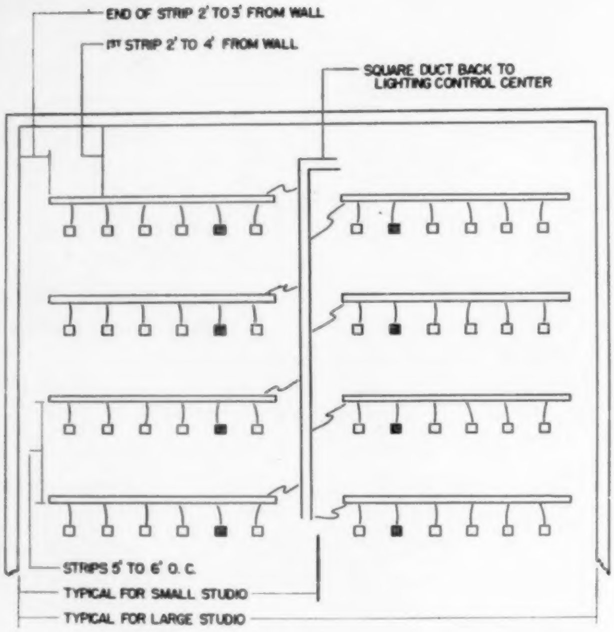
Special lighting effects, such as spotlights, moonlight and lights-out sequences, may be obtained by reducing the base light to approximately ¼ its normal value. Any special effects light is then adjusted to bring the total illumination level up to 1 or 1½ times the nor-

Diagram at left below is the electrical layout for a mobilrail installation (not to scale). At right below is diagram for a mobilrail layout (not to scale).

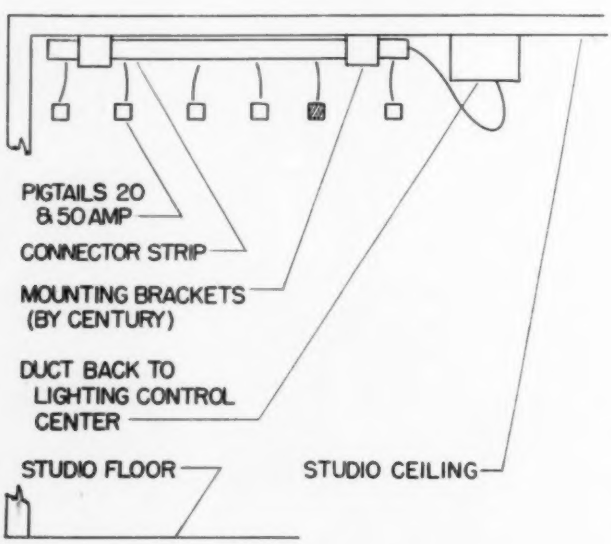




Switchboard for patch and dimmer controls. Load cords of patch panel are at lower portion of the switchboard. Dimmer bank is at top.



Above is a partial plan showing the typical connector strip layout for large studios. Small studio would require half the number. Below is detail of a connector strip installation in a low ceiling studio.



mal base light intensity (light meter aimed at camera positions).

Effects light directed to backgrounds to create window and similar shadows should not exceed 1½ times the normal base light incident upon the background in question.

Self-luminous objects or areas such as exposed lamp bulbs, lanterns and near lighted windows should not produce a light meter reading in excess of ¾ to 1 times the normal base light reading, when the meter is held a few inches from the light source and directed at it.

In monochrome transmission, incandescent light sources can be dimmed to ¼ normal light intensity without impairing spectral response because of change in color temperature.*

Electrical System for Broadcast TV

Let us assume that a typical studio for broadcast TV has 1,000 square feet of area, being 25′ x 40′ in size. This will require 56 overhead and 7 wall circuits, with 17.9 square feet per overhead circuit. The electrical system will be as follows:

- 8 — 20′ Connector strip: Seven 3′ pigtails, each 20-amp. capacity, terminating in 3-pole, female pin connectors.
- 3 — Wall receptacle: Double 20-amp. 3-pole pin.
- 1 — Wall receptacle: Single 50-amp. 3-pole pin.
- 93′ — Cyclorama rail: Aluminum I-beam rail with suspension straps and 93 ball-bearing rollers and curtain hooks.
- 1 — Switchboard: Patch panel with 72 load cords (62 20-amp. and 10 50-amp.), 39 control jacks, 6 group master preset switches. Plus:
- 1 — Dimmer bank: Six 6 KW transformer interlocking dimmers, 1 master interlocking handle, six 50-amp. primary breaker switches.

Equipment for Broadcast TV

Equipment needed for the operation of this typical studio for broadcast TV is as follows: (The load power is determined as 31 watts per square foot)

- 3 — 3″ 75-150-watt Fresnelite with a 2-way barn door
- 18 — 6″ 250-750-watt Fresnelite with a 2-way barn door
- 6 — 8″ 1000-1500-watt Fresnelite with a 4-way barn door
- 15 — 18″ 750-2000-watt scoop with diffuser frame
- 3 — 6″ 250-750-watt pattern projector with shutter and Gobo slot
- 1 — 6″ 1500-watt follow spot
- 2 — 6′ striplight, 12 lamp unit with a 3′ pigtail and 3-pole male pin connector
- 9 — 12′ extension lite-lift with 18′ jumper 12/3 cable, 20 amp pin connectors
- 3 — 24″ 3-legged castered stand, 5′-8′ extension
- 3 — 24′ jumper 12/3 cable, 20 amp. pin connectors

Lighting plans should be prepared in detail for all repetitive productions to ensure reproducibility of established lighting conditions.

* These procedures have been abstracted from "Television Broadcasting" by permission of the copyright owner and author Howard A. Chinn and the publisher, McGraw-Hill Book Company, Inc.

ASPECTS OF FINANCE AND MAINTENANCE

FACTORS which influence the cost of new school buildings are variable and countless. Despite the complexity of the situation, educators and architects have been able to scheme and dream buildings into creation which fit the purses of the school district clients. Their unceasing efforts are not unrecognized, as will be seen in the comprehensive analysis of school buildings costs and finance which follows.

One way to protect a community's sizable investment in buildings and equipment is through good maintenance. Efficient practices of school plant maintenance and operation mean long life for new buildings and the prolonged service of older structures. No school district can afford to neglect its maintenance program.

San Jacinto Elementary School, Liberty, Texas, was designed by Caudill, Rowlett and Scott, Architects, with repetitive structural units. Economy in labor and materials resulted, since no exterior or interior finish material had to be cut on the job, except roofing felt and a few filler pieces.

Ulric Meisel—Dallas Photos

SCHOOL BUILDING COSTS: CONTROLS, ECONOMY AND COMPARISONS

by N. L. ENGELHARDT, JR.

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To the average citizen the school budget is responsible for a big slice of taxes; school construction is usually the largest single undertaking he is personally concerned with. The school budget *is* big, and it is easy to assume that by cutting building cost, substantially lowered taxes will result. Actually, this is seldom true; expensive as school buildings admittedly are, they account for only 7 to 15 percent of the annual school tax. Since other municipal services are also tax-supported, school buildings constitute an even smaller portion of the total annual tax bill.

Why? Because construction and equipment costs are commonly amortized over a period of twenty years or more; because about 80 percent of the school dollar is required for operation and instruction, the residue—usually less than 5 percent—for building maintenance. Unless the relatively small annual cost of construction is appreciated, there is a dangerous temptation to cheapen new school buildings excessively by demanding economies that are really extravagances. Such "economies" directly increase operating and maintenance costs because a school designed too tightly can hamper educational procedures as well as increase expenditures for such things as light, heat and power.

Inadequate construction multiplies maintenance costs. Since there is already resistance to tax increases, the only source of extra maintenance dollars is the part of the school budget allocated to operation and instruction. Cut this too far and you instantly lower educational quality. How, then, can construction costs be controlled?

To make certain that a school will be economical

to construct, use and maintain, that it will house present educational programs well and accommodate inevitable change gracefully, requires judgment founded on understanding a number of complex factors. Most of us judge by comparing one school with another, and in so doing we find each building program's adherents ready to prove statistically how economical it is, while its opponents similarly prove its unwarranted expense. Both are likely to be wrong, for seldom do the statistics have comparable, let alone identical, bases.

School Structures Differ

School structures which seem to resemble each other often embody differences which, though they appear unimportant, may account for substantial cost variations. Measurements may all be in terms of feet and inches, but different elements weight the results. Whether comparisons are to be interpreted correctly or a school is to be evaluated independently, it is necessary to know what factors influence costs, those inherent in the nature of each individual school plant as well as others external and less subject to control.

Influences of cost inherent in each individual school include:

1. The educational specifications
2. The nature of the site
3. Functional efficiency of the design
4. Architectural character
5. Quality of labor and materials
6. Type of construction

External influences on cost are found in:

1. Geographic location
2. Cost of financing
3. Time of bidding
4. Market conditions generally
5. Value of the construction dollar

Let us consider these factors separately. Each has an influence on school costs; any or all of them may combine to affect cost comparisons.

The Educational Specifications

The statement of educational requirements in terms of space, of organization of equipment and of desired character—called by schoolmen, educational specifications—heads the list since it is possible for this factor alone to increase or reduce school construction cost by 25 to 30 percent. If the educational specifications are insufficiently detailed or too loosely drawn, there is every likelihood that the building design will be wasteful. The converse is also true; too rigid a set of requirements may raise initial costs by hindering the search for the most appropriate design ideas. Early obsolescence is likely to increase the long-term cost of a school predicated solely on today's educational demands. Good educational specifications consider future possible changes as well as today's requirements.

If a community is really limited financially, the educational specifications may, by eliminating auxiliary areas, by requiring multiple use of space (auditorium, cafeteria, etc.) or by other means, restrict the number of square feet per pupil. In a wealthier community higher limits may be set. Wide variations are not uncommon, and the local situation is not the only cause. In larger schools area per pupil is often less than when enrollments are small.

In New York State the number of square feet per pupil in secondary schools varied from 70 to 188 in the period 1949 to 1954. In Massachusetts, in 1955 the range was 82 to 170. The variation reflects not only local financial status and educational aims; among other things it is also related to the capacity of the school. The Attleboro, Massachusetts, High School, capacity 386, provided 170 square feet per pupil; at Natick, Massachusetts, where capacity was 1,400, the unit figure was 142 square feet. However, types of facilities differ and there is no assurance that a large school is necessarily more economical of space than a small one.

Once factors such as these have been taken into account, or in the event that educational specifications set approximately the same standards, significant differences in area per pupil probably occur because one design is more efficient than another. A method of measuring design efficiency is given at the end of this discussion.

The Element of Classrooms

Many people compare schools on a per classroom basis, but there are faults in this concept. It is unsound to consider a building as a 12 or 14-room school, ignor-

Repetitive structural units of the San Jacinto Elementary School meant a savings of 3 to 4¢ a pound on the steel used.

Bishop V. Scott

Natick, Mass., High School, designed by Shepley, Bulfinch, Richardson & Abbott and Smith & Sellew, provides 142 square feet of space per pupil, at a capacity of 1,400.

ing such facilities as auditorium, gymnasium, cafeteria, student center, teachers' lounge, etc. How can a value be assigned to ancillary spaces when all schools may not possess them? The classroom may very well be the symbolic element. It is true that, though educational changes may be in the wind, on the basis of experience and today's best judgment the average classroom size can be specified within limits, and with little variation. For high schools the size is 700 to 900 square feet; for elementary schools, 800 to about 1,000 square feet.

It is apparent that per classroom comparisons are valid only when, in addition to the actual number of classrooms, both the non-classroom spaces and the size of the classrooms themselves are taken into account.

Educational specifications can be used to set the "tone" of a school plant, that is, the degree of fineness or quality desired; and they provide a means of control thus to be exercised over cost. The time to fix the level of quality is when these specifications are being drafted. While this level may be raised as work progresses (the temptation is hard to resist, and specifications can be most useful in holding the line) it is very difficult later to adjust to a lower standard.

If economy requires eliminating some aspect of the school plant, it is better to eliminate an entire category of one facility than to make trifling cuts here and there, or than to attempt to scale down the entire program. An omitted unit can be added later, whereas a series of undersized classrooms remains as a permanent deficiency. Certain areas in particular are worth study when an ambitious building program must be reduced.

Study Auditorium and Gym Needs

It is pertinent to say here that in terms of cost, large auditoriums should be chargeable as community, rather than educational, facilities, since there is very little need for a large auditorium for ordinary school purposes. The idea that the auditorium should be large enough to seat all the student body at one time is gradually being displaced by the concept of smaller units, more intimate and more useful in speech, dramatics, forums and debates, as part of the educational program.

Physical education facilities also come in for considerable questioning because they consume a large part of the total number of square feet, not infrequently as much as 25 to 35 percent. Gyms, swimming pools and locker rooms are expensive because their walls are high, long roof spans are required and auxiliary spaces are needed. Physical education equipment is costly. Here, again, local evaluation is the only way to determine the importance of physical education and recreation for the youth of each community.

In these and other ways educational specifications affect cost. Their importance cannot be over estimated. They should be prepared in detail, listing all spaces in the plant and the number of square feet in each, setting forth the philosophical relationship of each space to local educational aims and to the particular school's curriculum, and the desired physical relationships. Whoever may prepare the actual document, determining what the specifications say is the joint responsibility of the school's professional staff, board of education, educational consultant and lay citizens, these last often organized in committees to facilitate their work and lend authority to their findings.

And yet, educational specifications are frequently neglected by laymen, sometimes ignored even by the professional staff. On occasion the problem has been left entirely to the architect, quite wrongly because this is an educational matter. Educational specifications are a reflection of teaching techniques and curriculum content, as well as the basis from which an architect can intelligently proceed to design, or a layman to evaluate, a new school building.

Site Conditions

Land development costs vary tremendously since they depend upon topography and soil conditions. The land may be sand, gravel, clay, woods, swamp or meadow, rugged or flat. The time to find out what it will cost to prepare the site for use is *before it is bought*. This statement may seem obvious, but so often is this factor neglected that its importance needs to be emphasized again and again. In judging a site, apparent virtues should not cause it to be accepted, nor should apparent faults lead to its rejection, without a thorough analysis.

Site Development Costs Vary

Variations in site development costs are evident in the tremendous range for schools built in Massachusetts between 1949 and 1955: for 65 secondary schools, from $15,000 to $281,000, with the median $36,000; for 41 elementary schools, $1,000 to $88,000, median $9,167. Here are some of the principal site factors which frequently cause high development costs:

1. Rock ledge to be removed.

2. Extremely steep terrain which may have to be leveled.
3. Unfavorable subsoil conditions such as swamp or fill which may require driving piles for foundations.
4. Swamp areas which may require draining.
5. Difficulty of access, requiring long roadways, excessively long sewage or water lines.
6. Flat, unadorned land which will require extensive landscaping.
7. Sand pits or quarries where topsoil has been removed, requiring purchase of new topsoil.
8. Distance from water supply and sewage disposal lines, which will require wells and septic systems. Of course, in rural regions wells and sewage disposal systems are needed. Where at all possible, it is desirable to tie these in with local systems even at some additional cost.

Unfavorable characteristics should not cause a site to be condemned, at least not until all the possibilities have been imaginatively explored. For example, Edgemont Junior-Senior High School in Westchester County, New York, was constructed on 72 acres which were literally covered with rock ledges. Although a considerable amount of rock was removed, the school plant was designed to fit the rocky conditions and minimize the amount of necessary blasting. As a result, Edgemont School has a beautiful natural environment, beauty obtained at a low cost because design talent was intelligently applied.

Landscaping for Flat Land

Even on flat land, footings and drainage may necessitate earth-moving operations. Yet, schools should be attractive places. Trees, hills and other natural formations can be turned to advantage. A flat piece of land, devoid of trees, may necessitate very expensive landscaping in contrast to the site which can be developed naturally.

Land development costs include preparation of actual building locations for construction work; development of athletic and play areas; landscaping and seeding; roads, sidewalks and parking areas; utilities (water, gas, electricity, sewage, drainage); surveys, borings, test pits; and, if this work is handled separately from the architectural contract, landscape architects' or civil engineers' fees.

Edgemont Jr.-Sr. High School, Westchester County, N.Y., was designed by architect Warren H. Ashley to suit the rock ledges which abound on its 72 acre site.

In addition there is the cost of the land itself. Since the price of land is a small part of the total cost of a school building project, it is advisable to purchase a tract large enough so that architects may have maximum leeway in laying out athletic fields and locating buildings to assure economy. Spending a little more for additional property may reduce the cost of construction by permitting the planner to avoid rock excavation, heavily wooded areas, steep terrain or low spots. Acceptable site sizes today range from 10 to 15 acres for elementary schools, 25 to 50 for junior high schools, 40 to 100 acres for senior high schools. And these sizes are often exceeded.

Design: Function and Efficiency

The net area devoted to educational purposes in a school is only a part of the gross area, but the gross determines cost of construction. (A method of evaluating efficiency fairly, on the basis of the ratio between gross and net educational areas, is given in the last section of this article.) Space is required for corridors, walls, boiler rooms, toilet facilities, janitorial areas, building equipment, pipe trenches, stairs and storage rooms, etc. Areas may be devoted to lobbies and non-utilitarian features, many of them determined by the architectural design.

The use of space as an element of the design itself rather than for any specific practical purpose has merit. Space can be organized and finished or equipped so that the user, seeing or traversing it, has a heightened appreciation of the building. His behavior within the building is then in keeping with what is desirable for the new structure.

The reduction of space to the functional minimum in order to save money should be thoroughly justified. This does not mean that we advocate waste. There are planners, either careless or inefficient, whose plans *do* contain considerable amounts of unnecessary space or wasteful areas neither functional nor beautiful. In a study of some 52 school buildings, we found a variation in the percentage of total space devoted to educational purposes ranging from 52 percent to over 83 percent. At one extreme, 48 percent of the gross space was "needed" for non-educational purposes, while at the other only 17 percent was required for such uses.

Begin With Efficiency

To assure the creation of an efficient plan, it is well to begin at the time the architect is selected. Question him and review his previous work, including other types

of buildings as well as schools, to make certain he understands the importance of this point. Sometimes the educational consultant is required to check architectural plans for reasonable efficiency.

Two space elements which can be major sources of inefficiency are corridors and room heights. It is impossible to eliminate all circulation elements, but much can be done to reduce them. Reduction or elimination of corridors, permitting the students to move from building unit to building unit out-of-doors or by means of covered passageways, may save 10 to 20 percent of the building cubage. A word of caution, however, to those who would save money by reducing corridor widths in congested buildings. This can be almost fatal in planning. Schools have been built with classrooms lining both sides of a corridor too narrow to handle traffic.

Though fire regulations may determine minimum corridor widths, it should be remembered that these are only minimums. It is obvious that a school will be

Joseph W. Molitor

In Charlotte, N.C., schools, like the Double Oaks Elementary designed by A. G. Odell Jr. & Assoc., are of a high aesthetic as well as practical quality and upgrade the surrounding residences.

overcrowded at times, and the corridors will probably be overloaded. Narrow corridors can also hamper the addition of future classrooms.

For years the standard height of classrooms ranged between 11 and 12 feet, floor to ceiling, so the windows could be large enough to admit ample daylight. However, many state agencies no longer consider maximum daylighting as important as overall economy of space. In many parts of the country artificial lighting is more dependable than daylight and lights are commonly left on anyway. So now, many classrooms are built 8 to 10 feet in height, resulting in substantial savings in the amount of wall partition materials needed, as well as in heating costs.

Architectural Character

It is the architect's duty to produce a building appropriate to a particular school and community in appearance as well as in function. Sometimes this quality of design costs more than unimaginative design and must be justified; sometimes the attempt fails. Yet, in the best instances, the kind of good looks that grow out of and are inseparable from practical requirements, mean little or no increase in cost. Indeed, the "best" design is often the least expensive.

The problem is to judge just how appropriate a design is. Design problems can be tackled at the practical level. It would be inappropriate, for instance, to erect a niggardly school in a community of wide, tree-lined streets and gracious homes. The converse is not necessarily true; a pleasant school can do much to raise the tone of a whole neighborhood. This has been done in Charlotte, North Carolina, where the tax base is substantially buttressed if not actually raised by building schools of a high aesthetic as well as practical quality, with a resulting upgrading of surrounding residential properties.

Reviewing the School Design

When a school design is under review, specific questions can be asked: what is gained by this arrangement of courts, that use of a building material, by a certain sequence or proportioning of spaces, by use of color, by emphasis on a surrounding landscape or by rhythmic repetition of such architectural elements as windows, doors or chunks of masonry?

To ask such questions is to get at the guts of architecture. Far from being considered impertinent, they will be welcomed by any good architect and answered at length because they imply understanding of his fundamental objectives—which are to interpret the community's needs, explicit or implicit. If the answers are satisfactory, that is if the school will be lighter, more pleasant, more comfortable, more suited to its educational functions and community purposes because the architect has employed certain devices and approaches to design, if his conceptions appear to achieve these ends without extravagance, his design is probably worth all it costs.

Bear in mind also that good architectural design is one of the most certain means of reducing vandalism, which is both morally and financially desirable. Like their mothers and fathers, children resent what they fear; a building that scares them because it looks like a factory or jail is almost inevitably a target for rocks. Many a window in an unattractive school is broken. On the other hand, large glass areas characterize a good many excellent modern schools, and so proud are children of them that seldom is their glass maliciously broken. Also, children are hard to fool on matters of quality and appearance.

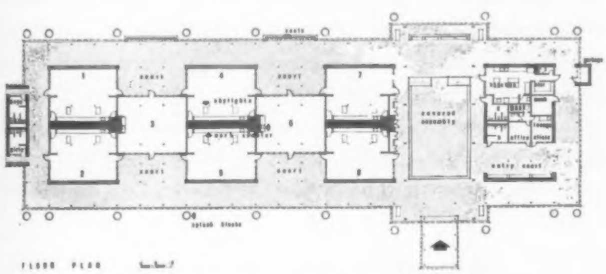
Quality of Labor and Materials

Almost anything purchasable can be obtained in several different qualities. School building construction is no exception: roofing, windows, asphalt tile, lumber—

all building materials and products—are available in many grades. However, materials alone do not determine construction quality since even the best materials may be well or badly used; the capability of labor is perhaps more important even than quality of materials. Labor is also a highly variable factor, differing not only from place to place, but also with the passage of time.

As techniques change, so labor necessarily does. As a matter of course we use methods today which were unknown a very few years ago. This is true of the whole range of construction practices, from painting (which used to require four or more coats for the best job, but today's paints do as well in two or three) to such fundamentals as soil preparation, compaction, trench digging, etc. Techniques developed for highways and airports are beginning to replace some cruder building construction methods.

The exact technique is a matter for architects and engineers to know thoroughly and to specify as such. What is important here is the understanding that there is a variety of building products and practices and new ones are constantly evolving, that the conscientious architect will incorporate in his work those that do a good or better job, and at the same time will save money. In America, labor time, particularly the time hand labor takes on the job, is more expensive than the actual materials. This has been even more true with the passage of time.



Floor plan of the San Jacinto Elementary School reveals the attempt to avoid the monotony of a long string of classrooms.

The architect is familiar with technical matters of construction and should be consulted when the economy of items or techniques is questioned. To be sure the conclusions are also educationally sound, it is necessary to call on the advice of the consultant and the school administrator. This procedure may be followed in all questions dealing with construction economy.

Economy Through Stock Sizes

Parts of buildings, including wall panels, are available in stock sizes, many with factory-finished surfaces and joints or edges. These are packed and shipped in ways that prevent damage in transit. For low construction costs a school building may be designed so that stock-sized materials can be put in place without cutting or fitting on the job. Yet how often this obvious fact is overlooked! Most such materials, even when they come from different manufacturers, are of coordinated sizes.

If "stock" sizes are not exactly right, the dollar value of the average school building contract is great enough for the manufacturer to be willing to produce a special run at stock-size price. This has all the advantages of both custom design and mass production. It is necessary, however, for the design of the building to require as few variations in size as possible. A dozen sizes of panels, doors or windows for, say, a ten-room school will be costly. If these can be reduced to one or two, money can be saved.

The stock size principle applies also to such building components as steel beams and columns. An elementary school in Texas was designed so that, for the entire ten-classroom building, only one size of lightweight beam, one size of slightly heavier girder, and one size of steel column were required. The details for the joints where these framing members met were reduced to three standard assemblies, and not a single piece of exterior or interior finish material had to be cut on the job except roofing felt and a few filler pieces. To design a good looking building thus, and to make allowances while doing so for variations in some of the necessarily rough field work of construction, took some doing.

The result was a school that has won national recognition architecturally and educationally, and that (since it was designed for a carefully worked out set of educational specifications) has functioned well in use. Costs were substantially less than the going rate for that time and place, and the structure was speedily built; the entire construction operation proceeded with unusual smoothness. The architects, builders and manufacturers all made reasonable profits; the community spent the minimum and, comparatively, got more than its money's worth; the school children will continue to reap benefits for many years.

From such an example it is easy to understand that a right-angled corner is economical because brick, block, etc., do not have to be cut by hand to form it; that a series of repeated units is economical. We do not, in saying this, advocate monotony; it is the architects' job to produce a design that uses repetitive units to the utmost (which he calls modular design because it is based on a dimensional module or unit of size) without being monotonous.

This kind of design permits taking full advantage of large building units—wall panels, etc.,—that are virtually factory finished. The amount of special material such as cut stone, special trim, etc., can be reduced to the minimum without impairing quality in either practical or aesthetic terms. Sometimes a material that is normally a high priced specialty is available locally in low priced quantity, for instance, marble in Vermont or Georgia.

Another way to hold down construction costs is by omitting certain elements, perhaps entirely, perhaps for later completion, perhaps to be executed by the school maintenance staff or as capital outlay items rather than as part of the construction contract. This has been carried as far as omitting brick facing and simply painting the back-up block, or by leaving out lighting fixtures. Sometimes no cabinet work is done, and only the bare classroom, plus a little chalkboard, is supplied. If such extreme economies are essential, the fact should be recognized from the start. In this way, maximum economy will be achieved, because to reduce quality from a level previously established is exceedingly difficult, and because the various parts of a building are interdependent in ways which are not always apparent.

Omissions should be made before bids are taken or, at the very least, should take the form of alternate bid

Hudson Falls, New York, High School has sizeable exterior areas which are faced with marble, a local product available economically for the project. Plant was designed by Sargent-Webster-Crenshaw & Folley, Architects.

proposals made by reputable contractors. The not infrequent practice of negotiating such matters with the contractor after bids are received is seldom satisfactory. The successful bidder has already pared his profit to the utmost. He is a business man and will construe it as his right to keep post-bid allowances for omissions to a minimum. Changing the rules at a late stage of the game may even wipe out his profit. If changes are extensive, it may be preferable as well as ethically and legally desirable to readvertise for bids.

Decisions regarding materials, equipment and labor are important from the time design starts until the construction contract is signed. Most of these decisions should be the responsibility of technically competent personnel—consultants, architects, engineers—and yet it is important for the average citizen to understand the principles on which they are based, the opportunities and consequences they present.

Type of Construction

Type of construction may be considered in regard to fire-resistance; height, compactness and disposition of buildings; permanence of construction; and structural systems. Economy and cost are affected by all of these, and among them are certain hard facts which inevitably help to determine the nature of school plants.

Of great importance is fire safety, because the decisions of insurance rating bureaus (which are private agencies) and fire marshals (public officials who interpret state and local regulations) control some fundamentals. Sometimes their decisions seem capricious. Not only do fire safety laws vary from state to state, they may be different in cities within the same state, and their interpretation by local individuals varies. On top of this, the insurance rating bureaus set their own standards which vary from region to region, and seldom do they indicate approval or disapproval of a type of construction or detail until after a school is built.

Rating bureaus classify schools (and, indeed, all insurable structures) as *fire-resistive* (highest insurance rating and usually most expensive to build); *semi-fire-resistive* (rating fair, construction moderately expensive); *non-fire-resistive* or *combustible* (often a poor rating, construction least expensive).

To build in the least expensive fashion is not always cheap in the long run. The insurance rate for combustible construction may be so high that premiums will, in a few years, amount to more than any initial saving. On the other hand, if there are enough exits, combustible construction may be the best choice for a particular one story school. Buildings of two or more stories are usually required to be fire-resistive. Sometimes (for instance, when local fire-protection measures are less effective than they might be, as in rural areas) the more expensive construction is required even for one story schools.

Determining Number of Stories

A factor, previously discussed, site and soil conditions, enters the building story picture. There have been arguments from the Atlantic to the Pacific over the economy of one story versus two story schools. This question, like many others, cannot be conclusively debated in the abstract. Valid conclusions or comparisons can be drawn only after thoroughly weighing each individual situation. In Hamden, Connecticut, a new junior high school was built on a site which was formerly a commercial dump. To use such land, piles had to be driven 30 to 40 feet deep. Piles are expensive. In order to get the most for every penny spent it was necessary to load the piles as heavily as possible, which meant multi-story construction. In this special circumstance a three story building proved most economical.

In contrast, at Middletown, Connecticut, a small elementary school was to be built in a wooded area of irregular topography. The greatest economy was found in a campus plan composed of a number of small buildings of four classrooms each, eliminating corridors and connecting the units by paved walks. In this case a two story school would have been more expensive per useful square foot because it would have required corridors

and at least two stairways per unit. The economy of small one story buildings was substantial at Middletown, although the local rating bureau required fire-resistant construction regardless of the number of stories and exits!

It is generally agreed, however, that under normal site conditions and with a similar type of construction (assuming "normal" and "similar" enough situations could be found) there is probably little difference in cost between one story and two story buildings. Yet multistory buildings impose two serious limitations. First, though theoretically the two story school (and this applies more as the number of stories increases) is more compact and hence is thought to be more efficient, it may actually be less efficient than a number of smaller one story buildings dispersed over a site. This conclusion is inevitable when you consider the ratio between net area useful for education and gross area including corridors, stairs, walls and partitions, boiler room, etc The more corridor and stair area, the lower the efficiency. Cost figured on gross area alone does not tell the true story. This is one of several reasons for the current popularity of campus plans.

Secondly, the building of two or more stories limits freedom to organize space so it will best meet the requirements because, once the floor area has been determined, the second floor must ordinarily correspond to the first. If all spaces do not fit perfectly there is either waste or a shortage.

There do remain times when a multi-story building will be desirable, even inevitable. Yet, the smaller buildings of a campus plan school, whether they be cottages containing a few elementary classrooms each or complex units housing high school laboratories and shops, seldom impose the expense encountered in multistory construction. Neither type of construction should be thought of as inherently wasteful or expensive, provided everything from class schedules to equipment and furnishings is laid out and selected logically for the particular scheme decided upon.

Danger Point in Standardization

We have said that a building made up of a number of standardized structural parts should cost less than one in which each part is cut and fitted on the job. This is true within certain limits. The danger point is reached financially and functionally when the building unit gets so big and important that the educational uses have to be curtailed or expanded unduly, and when the opportunity to make the building pleasing in appearance is likewise limited. A school building is a large undertaking. It is foolish to ignore the opportunity it presents to use economical repetitive parts; and equally foolish to put education, architecture and community pride into an engineered strait jacket of monotonously wasteful repeated parts.

There have been many attempts to prefabricate complete classroom units and even entire school buildings. As answers to urgent local needs these methods have sometimes met with a degree of success. As universal cure-alls for school building ills, attempts at prefabrication have sooner or later failed and either ceased production or changed completely in nature. Instance after instance can be cited of producers, often with excellent reputations in other fields, who have spent many times the cost of a complete school in research, publicity, developing production techniques and selling organizations, in an effort to mass produce schools. One producer, after a few years of effort and expense, has changed from offering standardized prefabricated buildings to offering a line of standard parts, a sort of full-sized meccano set, from which almost any desired building can be built.

Open Market Purchasing

At present, many competing manufacturers offer similar products in their standard lines of windows, doors, wall panels and structural beams and columns. It is possible through competitive purchasing in the open market to obtain comparable standard materials more cheaply. The standardized part producer has two potential advantages, he can offer parts so coordinated that no job time is wasted on cutting and fitting; and he can build up a stock-pile of materials. Both procedures should reduce construction time and, therefore, construction cost. Even these, however, are not advantages necessarily exclusive to the standard parts producer.

The new school project, as we have indicated, is a large enough job so that, when built of a series of repeated units, all the price and most of the time advantages of mass production are available, even if custom designed. It is seldom advantageous to a materials manufacturer to tie up a great sum of money in a stock pile of building products. He must manufacture his product on the basis of orders in hand, not on expectations.

What is most difficult about standardization for use in building any school anywhere is really not time or costs. It is the restrictions on economical, satisfactory layout which pre-standardization enforces. To determine standard unit dimensions there has to be a plan, a design. This means the standard for units of unduly large size is developed from a "stock" plan. No matter how ideal, how theoretically perfect the stock plan is for the normal situation, so many factors in each school building situation vary, and vary widely, that the stock plan almost always means either waste or an undesirable pinching of space. Both results are expensive. Also, remember that site conditions vary. In rare cases the same plan may be appropriate for two or three identical schools under one administration, but these are exceptional instances. While the possibility of stock plans

should never be ignored, it should not be allowed to delude a board, an administrator or an architect.

Temporary Overcrowding of Schools

Sometimes very unlikely expedients have been justified. For example, there may be a temporary overload of students—providing the condition can be proved temporary! Such a case might be a temporary influx of labor on a large construction project, or population dislocation due to urban rebuilding. Temporary, convertible units have been employed in several areas to fill such gaps in school facilities: portable classrooms near Detroit; a neighborhood school designed for eventual conversion to retail store use for another Michigan community; subdivision houses, without interior partitions, used at present for schoolrooms but ultimately to revert to residential use, near Los Angeles; a cheaply built addition designed to be torn down in a few years, near Boston.

These are all expedients. By educational yardsticks they are all substandard and expensive to maintain. Yet in weighing all pertinent factors, sufficient short-term financial advantages were found in these few instances to overbalance serious shortcomings. Not often is such justification possible, even when the budget for initial construction is severely limited.

In assessing type of construction, it is not necessary to know the technical aspects of structural systems. That is the job of the architect and engineer, who have a whole raft of techniques to put at the client's disposal: arches, vaults, rigid frames, conventional framing, bearing walls, and so on. Whatever the structure, there should be maximum appropriate use of repeated identical elements. Beyond this, the structural system should be understood only enough to be able to make certain it neither causes waste space nor inhibits changes in use as the years roll by.

Plan for Flexibility

If the walls between rooms are bearing, and hence cannot be moved without endangering the structure, the rooms they enclose should be easily converted from one use to another. If the roof is supported independently of the walls, that is, if walls and partitions are non-bearing, the total space enclosed should be able to accommodate any foreseeable future rearrangement of rooms. This, incidentally, is what architects and educators mean by "flexibility." Only by keeping such fundamentals constantly in mind can true economy of structure be obtained.

Geographic Location

Up to this point, in considering costs we have been dealing principally with matters over which local school authorities have some control (except for the decisions of insurance and fire safety agencies). Now we will discuss factors not locally controllable. Even so, many alternatives will present themselves.

The effect of geographic location on selection of materials is often misunderstood. Today our vast systems of transportation make many materials available everywhere. Only a few specialized or very new items used in construction are not nationally available. If one of these products, glare reducing glass for example, is to be used, bids should be asked for the item in a way which will ascertain its actual cost to place in the building. Having this, the cost of the specialty can be compared with other ways of achieving the same purpose. Sometimes the consultant or architect will have this information at his fingertips. Indeed, it is best if decisions of this kind can be made while the project is in the design stage, before construction bids are taken.

There is also the matter of local tradition. In parts of Tennessee, Georgia and other localities, brick and quality construction are traditionally synonymous. Any other material is felt to be of a lower order. In parts of New England, despite the questionable quality of locally available lumber nowadays, a long tradition makes wood construction more than acceptable, even though deterioration is rapid and maintenance expensive. Since schools are local institutions and should properly be keyed to local habits and traditions, such considerations are important.

Regional and Local Factors

The character of the school plant and the quality of construction, both determinants of construction cost, are also affected by more precisely definable regional and local characteristics. The average income level of the area and, in particular, the community; the strictness or laxity of state and local regulations; the nature of the school community (broadly classifiable as metropolitan, suburban or rural), are among the most important factors. Schools in a wealthy suburb cost more than schools in low-income suburbs, not only because such a community naturally demands more when it draws up its educational specifications, but also because all kinds of construction, like all other commodities and services, cost more there.

In some states there is virtually no state control over school building design. The range of costs in these areas is great and, often, in them the greatest economies are achievable (as well as the greatest waste). In others, notably those with detailed state-enforced specifications, true economy is hard to obtain. In general, we have observed that rural schools cost about 10 percent less to build than suburban schools, that schools in metropolitan sections cost about 10 percent more—a condition which may change as suburbs become more built-up.

Regional and local factors seem, for the time being at least, to have a certain relationship; that is, school

building costs in certain parts of the country vary predictably in relation to those in other parts.

Choosing the Right Time

When is the time ripe for building? Much can be saved if plans and specifications are let out for bids when contractors want the work. In northern states building construction is a seasonal activity. Since schools take long months to complete, there is a rush to get a number of jobs started in the spring. However, the contractor has many preparatory steps to take including obtaining subcontracts, placing orders, preparing his own organization, and so on. His work thus starts weeks, sometimes months, before there is activity at the actual site. The construction contract, then, is signed some time before site work begins, and bids must precede that.

So it is logical for contractors in the north to be in the market for work in certain months of the year. Other

A campus plan meant economy for Middletown, Conn.'s Wilbert Snow Elementary School. Irregular topography of the site was a challenge to architect Warren H. Ashley.

factors come into play (desire to have a new building ready for September; abundance of construction work, etc.) which will modify the date. It is best to consult with those who know the local situation, the architect, perhaps, to determine the bidding time most likely to produce economy.

Not always do seasonal weather variations have a strong effect. In warm, southern California, building activity can be continuous, and even in colder climates there are techniques suitable for cold-weather construction. The type of construction, then, also has a bearing. Panel walls can be erected at low temperatures which would slow the laying of masonry. Concrete work can be protected during the critical period of setting. For all these reasons competent technical advice is highly desirable before the bid date is fixed.

Cost of Financing; Effect of Marketing Conditions; the Construction Dollar

School buildings are mainly financed by bond issues amortized over a period of 10, 20 or 30 years. The importance of the interest rate as part of the cost of the school buildings can be illustrated by the fact that, if bonds are amortized over a period of 20 years, and the interest rate is 3 percent per year, the interest paid over the life of the bond issue would amount to 30 percent of the total cost of the building. A building which costs one million dollars to construct would have added to its cost $300,000, or an average of $15,000 per year in interest charges. In terms of influence on the tax rate, the interest paid may be the most important single factor in determining the cost of a building.

There are ways to reduce interest rates. The interest on bonds is dependent on the outlook and financial condition of the community, on the life of the bond issue, and on the bond market at the time of bidding for the bonds. "Selling" the community to the bonding company is one way of helping. In such a sales effort the financial condition of the community, the interest and ambition of its citizens in its schools and in the community at large, the aggressiveness of the community in terms of developing commerce and industry, the excellence of its planning processes, the character of its institutions—in short, the goodness of the community—are all factors which help bonding companies determine the most appropriate interest rate to bid.

Another factor to consider is the timing of the bond bidding. This timing can be most helpful, especially if the community is in a position to issue bond anticipation notes for short terms to help secure the best market for its bonds. Bond anticipation notes are short-term issues at low interest rates and are generally secured through local banks. They are not legally acceptable for school use in all states. Tax anticipation notes, issued on the basis of expected tax income and also short-term in nature, are another device for obtaining temporary funds, especially when construction is financed on a pay-as-you-go basis.

School bond interest rates are influenced greatly by the actions of the Federal Reserve Board. Fluctuations in rates reflect the Board's controls over credit and business activity in the interests of our overall economy. For this reason, careful timing of bond sales is important.

Decreasing Bond Issue Size

Interest rates may be reduced by decreasing the size of the bond issue, carrying part of the cost under current expenses. Such items as architects' fees, furniture and equipment, clerk of the works and bond attorneys' fees, might be paid out of current expenses spread over a period of two or three years. Considerable interest would be saved through the corresponding reduction in size of the bond issue.

There are also a few communities that have found it possible to pay for all school construction on a pay-as-you-go basis without any bond issues. In some states,

interest rates are reduced by utilizing the full "faith and credit" of the state in issuing state school construction bonds, as opposed to the limited "faith and credit" of a school district or community. This procedure may reduce interest rates considerably.

The comparison formula which appears on this and the next page has been developed by Dr. N. L. Engelhardt, Jr. as a means of making fair comparisons of school building costs and design efficiency. Variables are reduced to common bases and formula has a mandatory procedure.

1. COMPONENTS OF TOTAL COST

LAND PURCHASE PRICE		$______

SITE DEVELOPMENT

Grading	$______	
Drainage	______	
Roads	______	
Paved play areas	______	
Paved parking	______	
Athletic fields	______	
Fencing	______	
Water supply	______	
Sewage system	______	
Electric and gas service	______	
Outdoor equipment	______	
Landscaping	______	
Site subtotal		______

EQUIPMENT

Auditorium seats	______	
Bleachers	______	
Movable partitions	______	
Draperies	______	
Stage lighting	______	
Laboratory tables	______	
Chairs and desks	______	
Kitchen and dining	______	
Equipment subtotal		______

PROFESSIONAL FEES

Architect	______	
Consultant	______	
Clerk of works	______	
Engineer	______	
Other	______	
Fees subtotal		______

ADMINISTRATIVE COSTS

Board attorney	______	
Bond attorney	______	
Advertising	______	
Other	______	
Administrative subtotal		______

BUILDING CONSTRUCTION

Exclude all costs except:

General construction	______
Plumbing	______
Heating and ventilating	______
Electrical work	______
Cabinet work	______
Painting	______
Elevator	______

BUILDING CONST. COST ______

(Total actual cost $______**)**

2. CORRECTION FACTORS

External influences on construction costs represented by three indices

TIME	INDEX
1949	1.00
1950	1.07
1951	1.14
1952	1.18
1953	1.22
1954	1.27
1955	1.33
1956	1.39
1957 (Sept.)	1.47

REGION	
Northern New England	1.06
Northeast	1.33
Middle East	.83
Southeast	.66
Great Lakes	1.15
North Central	1.00
South Central	.86
West	.93
Pacific	1.22

REGIONS. *No. New England: Me., N. H., Vt.; Northeast: Mass., Conn., R. I., N. Y., N. J., Pa., Del.; Middle East: Md., D. C., Va., W. Va., Ky., N. C.; Southeast: S. C., Tenn., Ga., Ala., Miss., Fla.; Great Lakes: Ohio, Mich., Wisc., Ind., Ill.; North Central: Minn., No. Dak., So. Dak., Ia., Nebr., Mo., Kans.; South Central: Ark., Okla., La., Tex.; West: Mont., Id., Wyo., Colo., Utah, N. Mex., Ariz.; Pacific: Wash., Ore., Nev., Calif.*

TYPE OF COMMUNITY	
Rural	.90
Suburban	1.00
Metropolitan	1.10

COMPOSITE INDEX

Time × Region × Type

______ × ______ × ______ = ______

CORRECTED COST = $\dfrac{\text{BUILDING CONSTRUCTION COST}}{\text{COMPOSITE INDEX}}$

$\dfrac{\text{(COST)}}{\text{(INDEX)}} =$

CORRECTED COST ______

3. COST PER PUPIL

PUPIL CAPACITY

TYPE OF SPACE	No. of Units	Unit Capacity	Total Capacity
Classroom	______	× 27 =	______
Kindergarten (on double sessions)	______	40	______
Science laboratory	______	25	______
Commercial education	______	25	______
Home economics	______	25	______
Art	______	25	______
Shop	______	20	______
Band or chorus room	______	35	______
Gymnasium or playroom	______	35	______
with partition	______	70	______
Swimming pool	______	25	______
General education laboratory or study hall	______	35	______
Total No. of Pupils			______

INDEX SOURCES:

Unit capacities (above) are those currently considered good practice. They must be used (regardless of actual capacities) if school comparisons are to be valid. Regional indices are developed from average square foot costs of elementary and secondary schools from July 1951 to Sept. 1952. Median average: North Central region. Time index is Engineering News-Record *Building Cost Index.*

ADJUSTED COST PER PUPIL = $\dfrac{\text{CORRECTED COST}}{\text{TOTAL NO. OF PUPILS}}$

$\dfrac{\text{(COST)}}{\text{(PUPILS)}} =$

ADJ. COST PER PUPIL ______

There is also the School Building Authority, a separate entity legally constituted in some states. It may be a statewide or a local agency which can sell its own bonds, finance construction and lease or sell the school thus built to the community. Sometimes the terms are financially advantageous; sometimes the net cost to the community is greater because the bond market may not be as receptive to Authority issues as to municipal or school district bonds.

The chief advantage of this technique is the means

COSTS PER SQUARE FOOT

4. GROSS AREA

This is the total square-foot area of the floors, including stairways and developed basement areas, plus one-half the total square-foot area of the other areas listed below:

Floor areas (incl. stairs):
- Developed basement ____
- First floor ____
- Second floor ____
- Third floor ____

Porticoes ____
Bicycle sheds ____
Porches ____
Open, covered play areas ____
Passages ____
Sheltered bus loading platforms ____
Subtotal, divided by 2 ____

2 ____

Gross area = ____

ADJUSTED COST PER GROSS SQUARE FOOT =

$$\frac{\text{CORRECTED COST}}{\text{GROSS AREA (SQ. FT.)}}$$

$$\frac{\text{(COST)}}{\text{(GROSS AREA)}} =$$

ADJ. COST PER GROSS SQ. FT. $____

5. NET EDUCATIONAL AREA

This is the total square-foot area (inside dimensions, wall to wall, including cabinet space) of all spaces listed below:

Classroom ____
Kindergarten ____
Science laboratory ____
Commercial education ____
Home economics ____
Art ____
Shop ____
Band or chorus room ____
Gymnasium or playroom ____
Swimming pool ____
General education laboratory or study hall ____
Auditorium seating area, stage, stagecraft rooms, dressing rooms — not lobby ____
Music practice rooms ____
Cafeteria seating area—not kitchen and auxiliary spaces ____
Library reading rooms ____
Gymnasium locker and shower rooms ____
Administrative offices, health suite, guidance and conference rooms, teachers' workrooms, student organization rooms ____
Net educational area ____

Note: for comparison of educational programs divide each area by total pupil capacity (col. 3). This will indicate the differences between schools in availability of educational facilities.

ADJUSTED COST PER NET SQUARE FOOT =

$$\frac{\text{CORRECTED COST}}{\text{NET EDUCATIONAL AREA (SQ. FT.)}}$$

$$\frac{\text{(COST)}}{\text{(NET AREA)}} =$$

ADJ. COST PER NET SQ. FT. $____

6. PROGRAM AND MATERIALS

In comparing two or more schools the unit cost per pupil per gross or net square foot may vary because of differences in any or all of the following factors:

EXTENT OF EDUCATIONAL PROGRAM

Make separate comparisons of spaces in each category:

Regular classrooms, science laboratories, physical education, music, etc.

CHARACTER OF PLAN AND SITE

Size of site, number of buildings, number of stories

CHARACTER OF STRUCTURE AND MATERIALS

Fire and earthquake resistance
Framing: wood, steel, concrete
Exterior walls: brick-block, block alone, steel, aluminum
Interior: floor finish, wainscot, walls, ceiling, toilet room walls, locker room floors
Lighting: fluorescent, incandescent
Heating
Ventilating

Note: the factors above are not now reducible to dollar index figures, for comparative purposes. It may soon be possible to work out some broad quality classifications based on a) completeness of facilities, and b) standard of quality in materials and equipment. For example, a school with science laboratory rooms, art and music rooms, separate gym, auditorium and cafeteria might be called Class A educationally; one with separate gym, auditorium, cafeteria, Class B; with multipurpose room embracing two of the above functions, Class C; classrooms only, Class D. (Nothing invidious is meant, for example a new wing with classrooms only may make great sense; but it would still be unfair to compare its cost index with that of a complete new school.)

At some time a similar rating by construction groups, as A, B, C, or D, may be worked out.

DESIGN EFFICIENCY RATIO =

$$\frac{\text{NET EDUCATIONAL AREA}}{\text{GROSS AREA}}$$

Workable plans range from 50 to 80%
Good average for closed plan is 65 to 70%
Good average for campus plan is 75 to 80%

$$\frac{\text{(NET AREA)}}{\text{(GROSS AREA)}} =$$

DESIGN EFFICIENCY ____%

it affords of getting a school plant built even though the community may have reached its legal debt limit. There are some disadvantages. If (as often happens) there exist, concurrently, fairly rigid statewide controls over school building design, the net effect may be increased costs or money spent for items locally inappropriate, which amounts to the same thing.

Other devices have been proposed for financing school construction. One is the "lease-back" procedure which has a superficial appeal because it reduces the initial cash outlay. However, lease-back schemes usually cost much more in rentals (which soon reach staggering sums) than even the fairly high interest rates on conventional bonds. As a protection against this danger, many states limit the legal life of such leases to short terms, and some outlaw this method entirely.

When the economy is expanding it is not profitable to wait for a better bond market. Perhaps some slight economy in financing costs may be achieved, but this is almost always offset at such times by rising construction costs. The value of the construction dollar has declined steadily for many years—a trend which, in spite of periodic mild recessions, appears likely to continue. Sometimes prices of material and labor have risen so quickly that communities whose bonds were thought quite adequate have been caught short, and supplementary bond issues have been required.

Making Fair Comparisons

By now it should be evident that it is a complex matter to make fair comparisons of schools built in different places at different times, for different educational systems and of different quality levels. The many variables have to be reduced. This task, though it is difficult, can be accomplished by eliminating some variables and by finding common denominators for others.

Once this is done, the process of comparison can be accomplished by means of a reasonably simple formula, developed by N. L. Engelhardt, Jr. The formula takes into account the following variables which it is now possible to reduce to common bases:

1. Construction items constant in most contracts.
2. Time (year) of construction.
3. Geographic region.
4. Type of community.
5. Pupil capacity.
6. Measures of area and cubage.

Omitted from the direct comparison, although it is recognized that ways must eventually be found for comparing them, are:

1. Construction items sometimes included in the contract and sometimes not included.
2. Quality of educational concept.
3. Quality of construction.

In using the comparison formula it should be remembered that the results of each step are not actual dollar costs, they are "corrected" to certain norms. Comparisons made when using the formula will be found to be accurate within surprisingly close limits; but they will be accurate *only* if the constants or norms listed in the table are used. Employing any others will invalidate the results.

Heretofore, school cost comparisons have been misleading because there has been no standard, accepted basis for computing square or cubic feet, number of classrooms or pupil capacity; and little agreement as to use of even such poor data. This first attack on the problem to include all pertinent variables and constants is based upon many years of experience with hundreds of school plants.

Mandatory Formula Procedures

Mandatory procedures for computing building cost comparisons by means of the formula include:

Column 1. Building construction: only the listed items may be included. Other items too often appear elsewhere in the building budget.

Column 2. Construction costs vary with time, place and locale. Divide actual construction cost (from Column 1) by composite index (a percentage) to correct the cost to a constant base.

Column 3. Cost per pupil is the corrected cost (from Column 2) divided by total pupil capacity. To find the capacity, use only the listed educational spaces. Omit those not existing in the school being compared. Multiply each by the unit capacity shown in the formula. *Using any others invalidates the comparison.*

Column 4. Gross area is measured, according to New York State formula, to outside faces of enclosing walls.

Column 5. Net educational area is measured to inside faces of walls and partitions, including cabinets in the measured area. Include only listed spaces.

Column 6. Efficiency ratio (bottom of column) is the percentage of the educationally useful area, from Column 5, to the gross area, from Column 4; 65 percent is minimum acceptable in any case; 80 percent or more is unusually efficient.

Although the formula's application to date has necessarily been limited, its value has been demonstrated in the author's work. For full test and, if needed, revision, the author invites widespread use; criticism and comment may be addressed to him (at Engelhardt, Engelhardt, Leggett and Cornell, Educational Consultants, 221 West 57th Street, New York 19, New York). Periodic revision is anticipated in any case.

Sunquam Elementary School, Melville, N. Y.

Daniel Perry, Architect

Safety is a must for school bus operation and a thorough and vigilant maintenance program is essential for the safe transportation of children.

A SYMPOSIUM OF MAINTENANCE PRACTICES

PROPER MAINTENANCE OF SCHOOL BUSES

by FRED GEISS

Supervisor of Transportation, Parma Public Schools, Parma, Ohio

THE school system of Parma, Ohio, operates a fleet of 27 school buses. These buses make a total of 214 scheduled trips daily, besides many field and educational trips. Our buses are owned by the Board of Education and drivers are year-round employees.

The Parma Board of Education maintains its own school bus garage with a staff of full-time mechanics who do all the necessary repair work, except for upholstery repairs and difficult body work.

School bus maintenance may be classified in the following divisions, each of which will be covered here separately:

1. Daily inspection and maintenance.
2. Weekly inspection and maintenance.
3. Summer overhauling—usually major repairs and maintenance.

Daily Inspection and Maintenance

Before leaving the garage in the morning, each driver checks stop lights, head and tail lights, flasher, horn and turning signals. Testing the brakes and rear door latch is of the utmost importance. The driver must report promptly any sign of mechanical irregularities.

Sometime between trips the driver must sweep out his bus and check the supply of gas, oil and water. A thorough inspection of the tires is another daily must.

Weekly Inspection

Weekly inspection of school buses is done primarily by the garage mechanics. In general, it consists of checking steering, tie rod ends, drive shaft bearings and universal joints. Springs must be properly lubricated to prevent excessive wear.

A careful check of the brakes is made and the

International Harvester

Daily inspection of buses insures prompt attention to any mechanical irregularity which may disrupt service or may be dangerous.

clutch is adjusted if necessary. Checking for gas fumes along the exhaust line is important. Other items for the check list are battery, carburetor and ignition points. Seats and floor should always be inspected for wear.

Drivers are required to wash their buses once a week regardless of weather conditions.

The summer program is made up generally of major repairs. Buses are out of service for three months, thus affording considerable time for major work.

Motors that have excessive oil consumption are rebuilt, after compression readings. Valves are ground, worn king pins and clutches are replaced. All worn brake linings are replaced.

Wheel and master cylinders are cleaned and rebuilt if necessary, and wheel bearings are inspected and packed with grease.

Worn tires on front wheels are replaced with new tires; those with good casings are recapped for use on rear wheels. Worn or damaged seat backs and cushions are repaired or replaced, as well as worn floor coverings.

If it is at all possible, our mechanics repair bodies and fenders. Otherwise the work is sent out to a body shop. Necessary painting is done during the summer months.

Every effort is made to have each bus in tip-top shape by September first so that it can be given a good test run before final inspection time.

Safety is a MUST for school bus operation, and a thorough and vigilant maintenance program is essential for safe operation.

TRAINING AND SUPERVISION OF CUSTODIANS IN RACINE, WISCONSIN

by THOMAS A. LINTON

Director of Business Services, Racine, Wisconsin, Public Schools

THE function of public schools is to provide educational opportunities for youth and service to the community. Since education takes place in a building and on school grounds, the degree of educational opportunity present cannot help but be influenced by the type of building and ground facilities provided and the condition in which they are maintained.

It is the responsibility of each building service employee to perform the duties assigned to him in such a manner that the buildings and the grounds may contribute most to the education of children and service to the community. He must also be ever on the alert to discover better ways of performing tasks and reporting them, so that the services of the school may be further improved.

Administrative Organization

As in most school systems, the board of education of Racine, Wisconsin, is legally responsible for the determination of all policies and actions relating to the operation of the public schools. The board delegates to the superintendent of schools responsibility for the administration of all policies and plans of action.

The building service staff functions under board authority as a part of the business services division managed by the director of business services. The chief engineer assists the director of business service in maintaining and repairing the physical plant, and the custodial supervisor assists in training, scheduling and supervising building service employees.

The principal of each school is the administrative officer responsible for the total educational program in the school. Therefore, while school is in session, the building service employees work under the immediate direction of the principal of the school. The principal, in conference with the director of business services, reports on the work of each building service employee at least once each year. This report is signed by both the principal and the employee.

Authority is thus delegated from the board of edu-

cation to the superintendent of schools. Principals and the director of business services serve under the superintendent with direct control over the building service employees and custodial supervisors, respectively.

Promotion and Transfer

The building service employee with the greatest length of service receives first consideration for promotion and transfer, provided that he has the physical requirements and ability to fill the new job. Recommendations for promotion are made by the custodial supervisor through the director of business services and the superintendent of schools, who presents the recommendations to the board of education for final consideration.

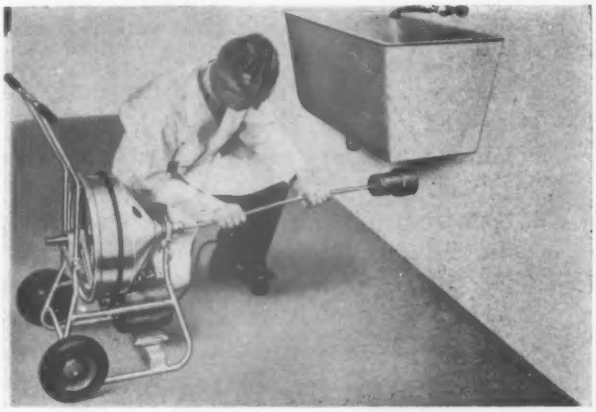
Any employee promoted to a higher job classification is kept in a probationary status for a period of ninety days, and is paid at the minimum salary rate of his new job classification. Upon successful completion of the probationary period, his salary is increased to the full rate of his new job.

Training Program

Building service employees are given a three-part training program. Features of the program include:

On-the-job training. The new employee is assigned to work with an experienced employee for a period of time before assuming his own duties. During this break-in period, the custodial supervisor observes the progress of the new man to be certain he is learning correct work procedures.

Special sessions. To provide instruction in a particular type of work, special sessions have been called in cooperation with various manufacturers. Subjects



Marco

A new custodian must be carefully trained in the use of various equipment, such as the automatic drain scraper shown above. Proper maintenance techniques will result.

which have been covered are the use and treatment of dust mops, use of vacuum cleaners and floor machines, cleaning, sealing and waxing of wood flooring, and care of unit ventilators.

Institutes or short courses. Two educational institutions in this area, Whitewater State College, Whitewater, Wisconsin, and the Racine Vocational and Adult School, Racine, Wisconsin, periodically offer no-charge short courses of a day or two in duration. Attendance is not compulsory, but all interested employees are encouraged to attend and are given the time off with pay. The Whitewater program is aimed directly at schools, while the Vocational School program includes related business and governmental units.

Racine's system of training and supervision of school custodial personnel has worked out most satisfactorily. The full staff totals sixty-five custodians, and the turnover is comparatively light.

GOOD MAINTENANCE HABITS FOR SCHOOL CAFETERIAS

by ELIZABETH MACKO

Secretary, Bridgewater Township Board of Education, Raritan, New Jersey

GOOD maintenance habits for school cafeterias have a vital and direct bearing upon the health of school children. Cleanliness and the highest type of sanitary conditions must be the continuous goal in the maintenance and operation of school cafeterias.

School cafeterias are required to meet the sanitary regulations for public eating places determined by state and local health departments. These should be the minimum standards. The welfare of the children demands the highest standards.

The New Jersey State Department of Education has published a bulletin recommending good sanitary practices in the cafeterias. Some of the recommended practices follow:

1. **Maintenance of physical features of lunchroom.** Floors, walls, woodwork, ceiling, doors, windows, ventilating and heating units, lighting fixtures, and plumbing units.
   a. The cafeteria employees should be provided with detailed cleaning instructions scheduled on a daily and weekly basis. Additional sched-

ules for such times as vacation periods should be furnished.

b. The custodial staff should be thoroughly instructed regarding cleaning duties.

c. Adequate cleaning agents and tools must be available.

d. Special attention should be given to cleaning the following:

(1) Kitchen floors. Scrubbed daily. Floors are not to be swept while food is being prepared or served or while pupils are eating.

(2) Doors, windows and woodwork. Washed as needed.

(3) Walls and ceiling. Cleaned regularly with suitable cleaner.

(4) Cafeterias checked at least monthly for needed repairs.

(5) Cafeterias thoroughly cleaned at the beginning and end of the school year.

(6) Additional screening, painting and other repairs taken care of during holidays.

2. **Maintenance of equipment, utensils and supplies.**

a. Storage Equipment.

(1) Garbage cans. Emptied daily. Covers and cans, inside and out, scrubbed daily with detergent and hot water.

(2) Trash cans. Emptied daily. Covers and containers, inside and out, washed as needed with detergent and hot water. Paper linings disposed of daily. Cloth linings laundered as needed.

(3) Refrigerators. Food which is spilled wiped up immediately. Shelves, trays, freezing unit, inside and out, scrubbed with warm water and detergent and thoroughly dried. Inside of refrigerator rinsed with mild solution of baking soda and dried.

(4) Ice cream cabinets. Cleaned and defrosted as needed. Covers scrubbed daily.

(5) Employees' locker. Washed frequently.

b. Tables.

(1) Dining room tables. Washed with soap and hot water after floor has been swept after lunch periods. Washed each day before lunch period. Washed after using tables for study hall and before food is served.

(2) Kitchen tables, including metal supports and shelves. Washed daily with soap and hot water, rinsed and dried. Metal supports and shelves painted once a year.

c. Sinks. Scrubbed daily with detergent, hot water and stiff brush; rinsed and dried. Drains to be kept free by occasional use of drain cleaner. Grease traps emptied daily. Exposed sink pipes washed frequently.

d. Dishwashing Unit.

(1) After washing dishes, machine is thoroughly cleaned.

(a) Water tank emptied and flushed with hot water before any grease collects.

(b) Dispose of food particles on scrap trays. Scrap trays washed with detergent and hot water and stiff brush.

(c) Curtains and spray arms taken apart and cleaned daily.

(d) Machine left open to dry.

(2) Tables scrubbed daily.

(3) Inside and outside of hood cleaned frequently.

e. Food Chopper, Slicer, Peeler and Mixer. Dis-

Douglas M. Simonds

Cleanliness and the highest type of sanitary conditions must be the continuous goal in the maintenance and operation of school cafeterias.

mantle completely after using and all parts cleaned.

f. *Steamer, Steam-jacketed Kettle, Stove and Hoods.*
   (1) Steamer. Clean daily. Remove shelves for cleaning.
   (2) Kettle. Faucet washed with bottle brush and rinsed.
   (3) Stove. Top, including cracks, openings and oven racks, scraped to remove grease and burnt particles. Washed with detergent and hot water, using a stiff brush, rinsed and dried.
   (4) Serving counter. Washed daily with soap and hot water.

g. *Cooking Utensils.* Washed, rinsed and sanitized. Utensils stored in closed cabinets located at point of use, on rack above table, or inverted or covered on shelf of table.

h. *Eating Utensils and Trays.* Dishes stacked in racks, prerinsed, washed, rinsed and sterilized, drained, dried and stored. Chipped or cracked dishes are hazardous since food and filth accumulate in crevices. These should be discarded. Trays washed and sterilized in similar manner. Air-dried or towel-dried, stacked, stored and covered.

3. Control of insects, mice and rats.
   a. Rear entrance and approach to kitchen kept clean and free from debris.
   b. Garbage and trash disposed of in accordance with regulations of local board of health. Should be disposed of as soon as possible.
   c. All food areas and facilities kept clean and dry.
   d. Foods should be properly stored.
   e. Screens used on all outdoor openings and kept in repair.
   f. Use of acceptable insecticide—after school hours.
   g. Schedule exterminating services.

The use of a sanitary check list is desirable. Such a check list can be used by the principal, the school physician, the school nurse, the pupils under teacher guidance, or anyone charged with the responsibility of inspecting the cafeteria or examining its practices. A desirable time to inspect the cafeteria is before, during and after meals have been served.

Cooperation Is Needed

To maintain a sanitary cafeteria, close cooperation is required of the cafeteria manager and staff, the teachers, the pupils, the principals, the custodial staff, the school physician, the school nurse and the health officer of the local board of health.

IMPROVING THE SCHOOL PLANT THROUGH MAINTENANCE IN MUSCOGEE COUNTY, GEORGIA

by NATHAN M. PATTERSON

Supervisor of Special Services, Muscogee County School District, Columbus, Georgia

MUSCOGEE County School System and the Columbus, Georgia, Public Schools merged into the Muscogee County School District on January 1, 1950. At the time of merger the two existing systems were automatically abolished and a new, independent county-wide school district was established. This change gave sufficient opportunity for the reorganization of all school affairs. Among the matters needing attention was the problem of consolidating the maintenance program and staff personnel.

The major considerations here were the maintenance standards to be established in the new system and the time schedule to be followed in carrying them out. A study of the problems revealed that a wide variety of conditions existed. The gap between the best and the worst operations was astonishing. Some of the conditions on the "better" side directly resulted from the fact that several new buildings were in use. The idea behind the "merger" was that no school would be lowered in standard, and that all schools were to be brought up, as required, to an acceptable standard by the board.

Maintenance and operation of the school plant were combined in the overall effort to guarantee that maximum service would be rendered to each school. Staff members worked to train janitors and maids in the use of common supplies and approved methods. Care of buildings was stressed, while additional personnel were added to guarantee proper care of facilities at all times. The principals and teachers worked with all others in the effort to unify the system.

Repairs had to be made in a number of schools in keeping with safety and sanitation demands. In fact,

safety and sanitation were placed at the top of the priority list for self-evident reasons. Next came standards of facilities as related to educational requirements. The number of needed chalkboards, equipment, classroom improvements, etc., were taken into account. At the same time concentrated efforts were being made by the maintenance staff in specific areas.

Attempts were made to establish a standard of appreciation for desired conditions, together with a procedure for requesting these improvements to be made. The overall approach was "double-barreled" since it was found that some maintenance requirements could be met through routine requests and regular channels. The more impressive, yet strictly localized, efforts were undertaken as a result of specific assignments of work details to the schools needing the most help. Within twelve months the most pressing tasks had been accomplished. At last, maintenance problems could be systematized, permitting work to be handled on schedule.

Elevation of Standards

More recently the maintenance department has directed its efforts to the general elevation of standards for all buildings, equipment and grounds. The task has been undertaken in this way. First, the basic needs for buildings were cataloged, permitting repairs and improvements to be carried out with maximum speed—namely, glass replacement, hardware repairs, lighting corrections, and tile replacements. With the help of such a catalog of items workers could be instructed on how to do each job and were equipped with tools and replacement parts before undertaking any task.

Once on the scene, every worker would proceed directly to his particular assignment. The grounds crew cleared each site of foreign materials and beautified the area. Careful attention was given to the removal of all debris, rocks and other items which might serve as a potential weapon of destruction in the hands of careless individuals. This added materially to the safety of children on the school grounds in addition to protecting the building. Grass was planted near each building and along the walkways, adding beauty to the site and permitting buildings to be maintained more easily as far as housekeeping was concerned.

The third step involved the furnishings of the school plant. A refinishing program was established to rework all old, but usable equipment. Certain units of equipment not being used were selected to be redone first. As these units were refinished, they would be taken to a school where equivalent furniture was to be found. The refinished furniture was placed in this room while the old equipment was moved to the Maintenance Department to be refinished in turn. The task of refinishing furniture continued within a particular building and so on as directed throughout the entire school district.

During the summer months a stepped up working schedule was established, using the workers and know-how of the refinishing crew in combination with surplus custodial workers now released from regular school duties. An intense training program of several days was given the surplus workers after their background, experience and aptitudes had been studied. The training thus given meant that the productive efforts of these custodial workers were concentrated to carry out the furniture refinishing work. With this expanded force ready to perform, orders were issued for assignment to a large school as a central place from which all furniture was to be refinished. A location of considerable size was selected and a mass production approach to the problem was begun.

During the past two summers over 3,000 movable chair desks, 40 cafeteria tables, 50 teacher desks and 100 miscellaneous pieces of equipment have been completely refinished. The average cost for refinishing these pieces of equipment has been 50 percent of the market value of equivalent new equipment. The summer program, combined with the regular refinishing program carried on during the school term, has virtually eliminated the great backlog of substandard quality furniture in use in the school district.

Program Is Organized

Maintenance staff members have been classified, trained and upgraded during the period since 1950. At present the custodial program is organized to handle all routine requests plus those brought about by the demands of higher standards in our educational system. Now, as new emphasis is being placed on science, as new health requirements for cafeterias are recognized, and as building and safety codes are expanded, maintenance must provide sufficient support to bring about the full realization of these changes.

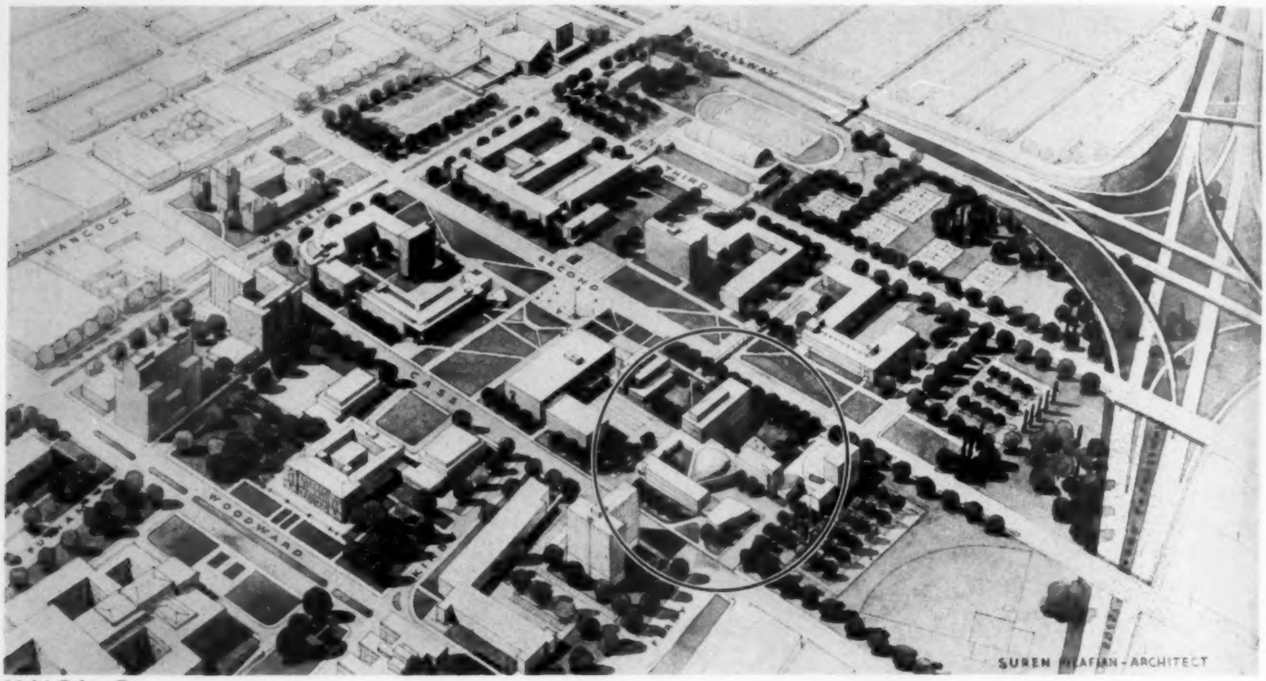
The "game" of maintenance is always to be worked as if it were the last quarter with the score tied. Yet, each player must perform in such a way as to play on even after the final whistle. There is a challenge in uncertainty—and assurance in the fact that a job has been done well.

Maintenance work, including the well organized and equipped staff in this system, has the task of keeping educational facilities moving forward in step with the ever increasing demands of the school district. This job is essential, and it must continue to be done well. The end result is a system of education which is always able to respond to the needs and requirements of changing programs.

EXPANSION ON THE COLLEGE CAMPUS

THE CHALLENGE of a growing campus is facing many colleges and universities. Some have met the challenge forcefully with master expansion programs of vision and intelligence. Others are compelled to place new structures wherever there is room. No matter what the initial approach, new college and university buildings are beginning to reveal changing attitudes on the part of administrators.

Educational, architectural and financial problems are being met with planning in terms of actual and future program needs. This is far removed from the old practice of permitting the college president or alumnus donor to dictate what a new building should be like. The result will be structures which really belong on the college campus.



Multi-Color Co.

Rendering shows the aerial view of the Wayne State University campus, located in the heart of Detroit. Within circle is the new Community Arts Center, designed by the architectural firm of Suren Pilafian.

WAYNE STATE UNIVERSITY COMMUNITY ARTS CENTER

by SUREN PILAFIAN

Architect, Detroit, Michigan

Mr. Pilafian was educated at New York and Columbia Universities. He obtained early experience in New York architects' offices and in Iran as a practicing architect. Mr. Pilafian has been practicing architecture in Detroit for the past sixteen years.

WAYNE State University's new Community Arts Center houses several diversified functions related to the fine arts. The building complex has been financed in large part by gifts given to Detroit by its community on the occasion of its 250th birthday celebration.

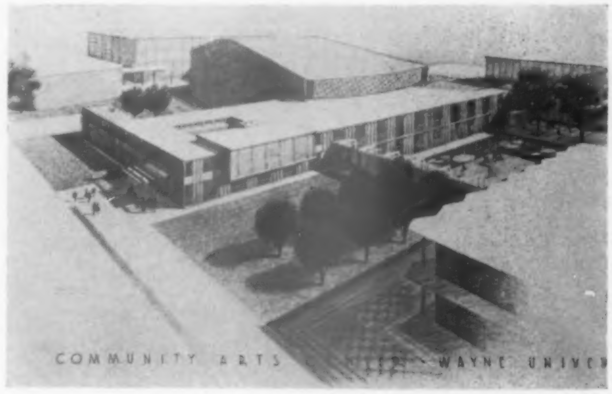
Located in the heart of Detroit, near the city's main library and the Detroit Institute of Arts, and adjacent to this urban university's central library facilities, the Arts Center contains an auditorium, exhibit gallery, art studios, music teaching facilities, headquarters for the alumni organization and a residence for the president of the university. The units were designed by the architectural firm of Suren Pilafian in Detroit.

Adjoining the Center, and connected to it by an enclosed passage, is the university's new Conference Building, housing meeting and dining rooms for public conferences. A water-centered, sunken sculpture court between the two buildings serves as a setting for both and provides an area for outdoor exhibits of sculpture.

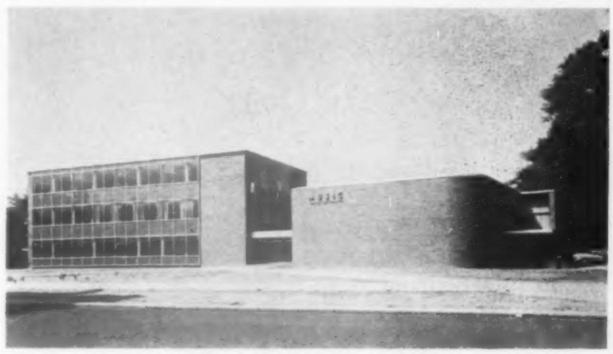
Planning and construction of the Community Arts Center extended over several years. The building program had to be revised from time to time to meet chang-

ing needs of the university. Adjustments were possible, even after construction had started, because the building was planned initially as four separate multistory units or wings, connected together at the first floor. The separate units are the auditorium, the art wing, the music wing and the north wing housing alumni headquarters and the president's residence.

The connected wing arrangement provided better acoustical isolation, more natural illumination and a more efficient relationship of spaces within each unit, at no further cost than would have been possible with a more compact plan. In addition, it enabled the start of construction for the first unit before the requirements of subsequent units were completely jelled, and before funds were available for the entire project. The music wing was completed in 1955 and the art wing in 1956, while the auditorium unit and north wing, now under construction, are expected to be completed late in 1958.



Above is view of the auditorium unit and the north wing which houses alumni headquarters on the ground floor. President's residence is on the upper level. Windowless part of the music wing, below, houses the rehearsal rooms.

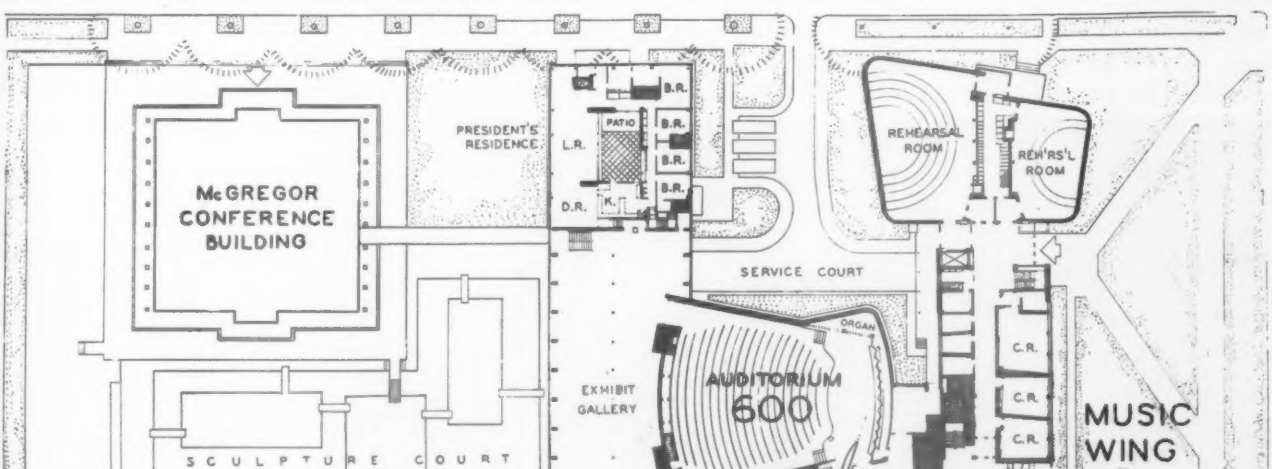


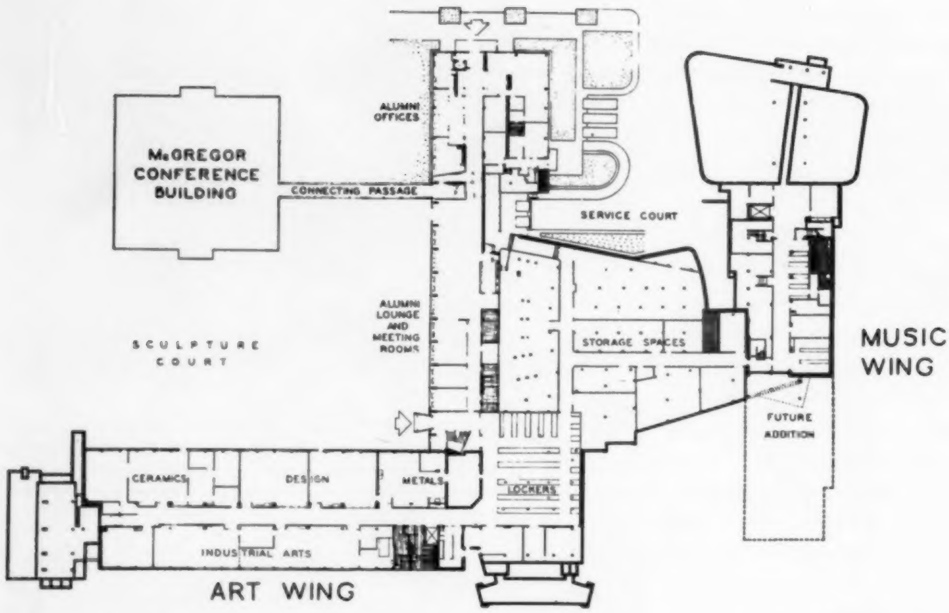
The Auditorium Unit

In the heart of the Center is a multi-purpose assembly room for lectures, meetings, motion pictures, playing of recorded music, organ, choral and instrumental concerts and recitals, dance performances, simple dramatic presentations and radio and television broadcasts.

This diversified set of uses presented problems of acoustics and sight lines which were not possible to solve with the best results for all uses. Compromises had

At the first floor level of the Community Arts Center are the 600-seat auditorium, music classrooms, studios, rehearsal rooms, offices, president's residence and the sculpture court and exhibit gallery.





Basement level of the center houses alumni offices, lounge and meeting rooms, arts and crafts areas, locker room, storage spaces and music rooms.

to be made. For example, by keeping the ceiling of the room low enough to make it possible for a lecturer to speak and to be heard comfortably, it was necessary to sacrifice a little of the tonal richness that a larger volume would have provided for musical performances.

The 600 seats are arranged in widely spaced continuous rows without intermediate aisles.

Large Platform Stage

The stage is a large platform and an integral part of the seating area, being only two feet above the auditorium floor and without proscenium or curtain. Its back wall consists entirely of a perforated projection screen, large enough for wide pictures and usable as a cyclorama for backdrop effects achieved with lighting. A wooden accordion door can be unfolded in front of the screen to provide a sound reflecting surface for musical performances.

A lectern for lecturers is at one side of the stage, backed by a wood screen with an integral enclosure for hi-fi speakers. On the other side, recessed in the wall but entirely exposed to the auditorium, are the organ pipes.

The foyer of the auditorium, close to 5,000 square feet in size, is a light, airy space overlooking the sculpture court. It is suitable for use as a lounge, for receptions or for frequently changing exhibitions. The ceiling is finished with cement plaster applied against the structural slab, and accommodates pressure jacks to support exhibits. Unistrut strips are installed in the ceiling from which exhibits may be hung. The lighting is adjustable for use as general lighting or as concentrated or diffused accent and display lighting. Interspersed with all these

Art wing is at left, music wing at right. A four story unit, the art wing contains studios, offices, classrooms, a terrace and shops. The music wing includes radio broadcast facilities.

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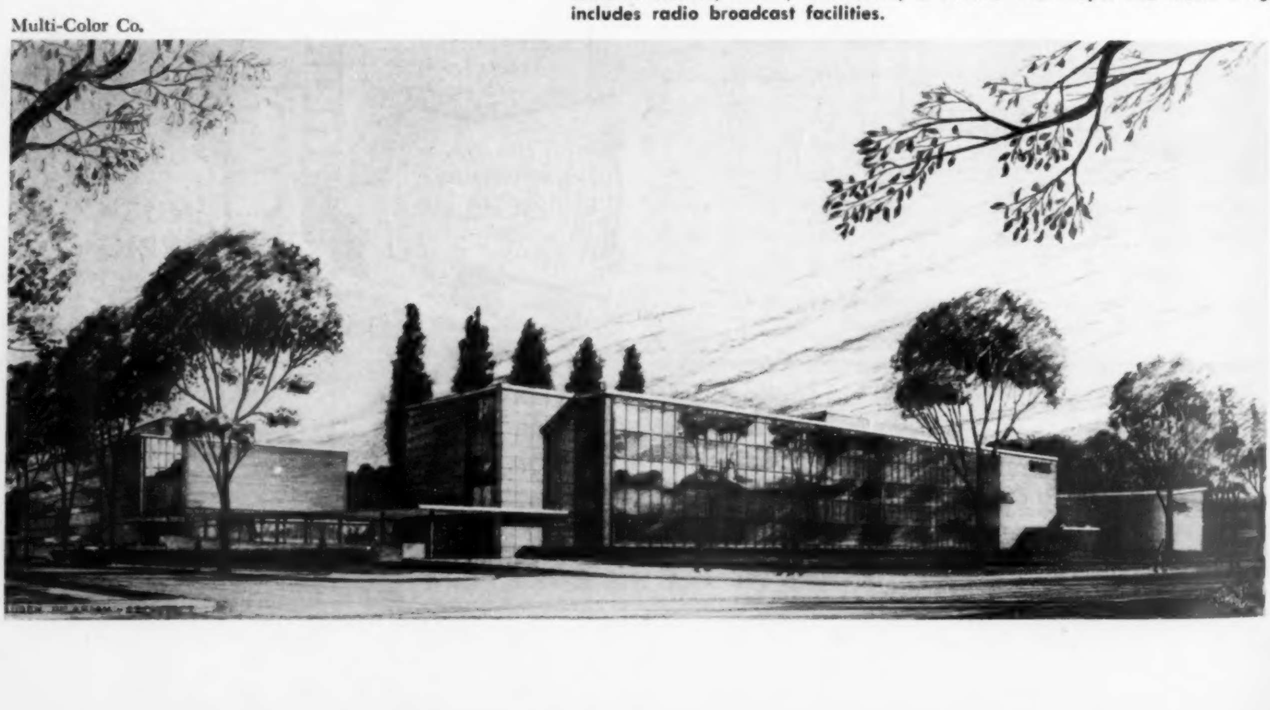


Hedrich-Blessing Photos

The sculpture studio, located in the art wing, has a skylight along the inner wall of the room. Shadow-free light is provided.

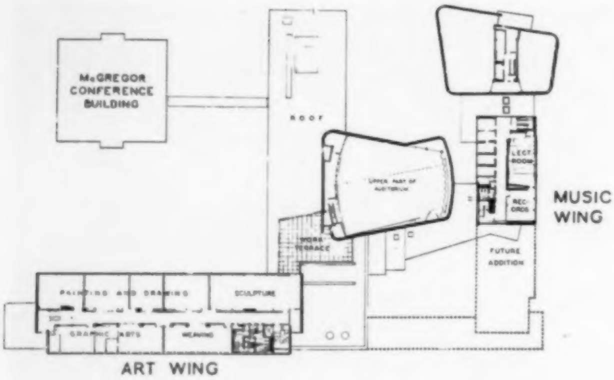
elements are acoustical tile panels to keep the noise level down.

Four Story Art Wing

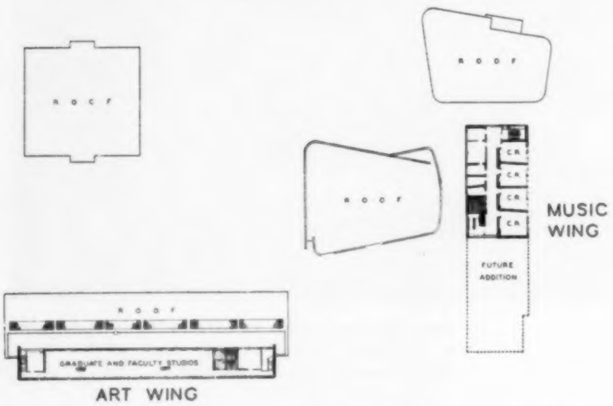
The art wing is a four story unit containing studios, offices, classrooms, terrace, and shops for work in painting, drawing, design, sculpture, ceramics, woodworking, metal working, weaving, silkscreen, graphics, industrial design, interior design and art education.

The painting and drawing studios are located along the north side of the wing, facing the sculpture court. Their tall windows and the skylights near the corridor

Glass block was used for the studios along the south of the art wing to provide field control of sun glare.



Second floor of the center has rooms for painting, drawing, sculpture, graphic arts, weaving, a work terrace, lecture room and a records room (above). Below is plan of the third floor.



walls provide an abundance of shadow-free daylight.

Most of the corridor walls of the studios are glass, providing a view of the studios from the corridor, or places for displays with screening drapery backdrops.

The fourth floor consists of a large, open "attic" type space, suitable for graduate and faculty cubicles.

The Music Wing

The music wing consists of specialized classrooms, lecture rooms, offices, instrument and music storage rooms, record listening and storage room and two rehearsal rooms complete with radio broadcast facilities.

The rehearsal rooms are separated from the rest of the building by one story high sound lock vestibules to provide the optimum amount of acoustic isolation.

Space has been left on the site for a future addition that might house practice rooms, choir room, library and additional classrooms.

The Offices and Residence Wing

On the ground floor of the north wing, with its own separate entrance, is a suite of offices, file rooms and workrooms for the alumni organization. These are connected to the basement level, a half-story lower, where are located the lounge, meeting rooms and kitchen facilities, opening directly onto the sunken sculpture court.

On the second floor of the north wing, grouped around a patio, are located the living and reception rooms of a residence apartment for the president.

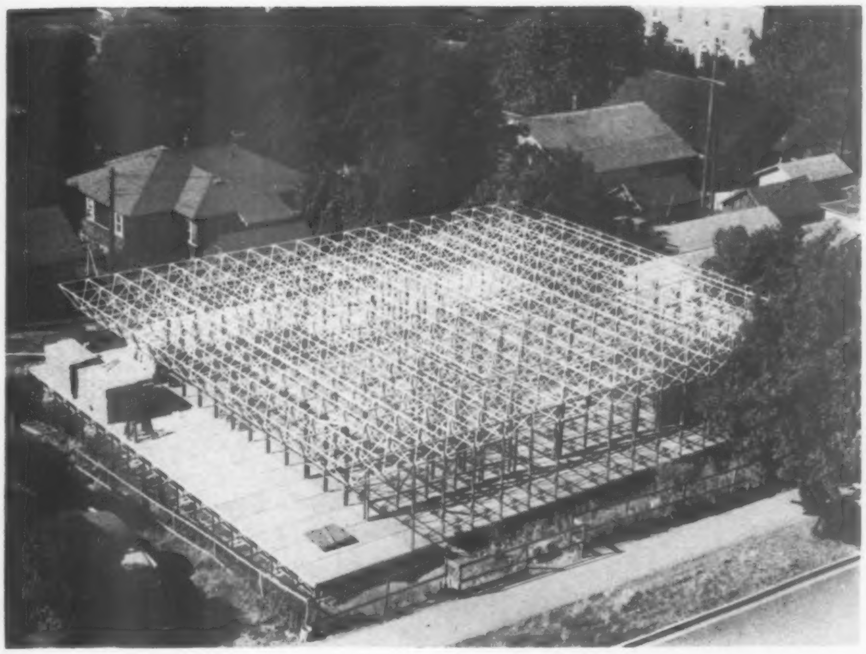
The Circulation Problem

One of the peculiar problems arising from the diversified content of the Center was the need to provide convenient circulation for various types of functions. Traffic had to be accommodated between the auditorium, exhibit lounge, alumni lounge and meeting rooms, conference center, alumni offices and the president's house, allowing each one, at the same time, to be isolated when required. This was accomplished with a stairway at the north end of the exhibit lounge. The stairway serves the five levels on which the involved facilities are located, providing direct access to each one.

The Costs Involved

Auditorium Unit	58,000 sq. ft. at $31.78	$1,837,000
Art Wing	63,000 sq. ft. at $18.59	$1,161,000
Music Wing	27,500 sq. ft. at $26.11	$ 712,000
Total	148,500 sq. ft. at $25.00	$3,710,000

The materials used in the Arts Center are as varied as the functions housed. In the auditorium and the alumni quarters such materials as wood, marble, brick and carpeting are used. The walls of the art wing and the music wing, on the other hand, are largely of utilitarian cinder block, painted in warm light gray colors to provide an appropriate background for the activities within the building. Plaster is used in the wings only to provide sound barriers between rooms.



Lacework pattern of the Unistrut space-frame roof hovers above the floor level platform of the Washington State Regional School Laboratory. School was designed by Robert P. Darlington.

REGIONAL LABORATORY FOR SCHOOL BUILDING RESEARCH

by ROBERT P. DARLINGTON

Assistant Professor of Architectural Engineering, State College of Washington, and Head, School Research Program, Washington State Institute of Technology, Pullman

Mr. Darlington has a B.Arch. degree from Cornell University and an M.Arch. from the University of Illinois. After two and a half years of military war service, he worked in architectural offices in Chicago. Since 1953 Mr. Darlington has been associated with the State College of Washington.

RESEARCH can take many paths and uncover many answers in its devious wanderings. Occasionally, a result of great value is stumbled upon far removed from the original objective. To a certain extent, this is what happened in the case of the Washington State Regional School Laboratory being developed at the State College of Washington, Pullman, Washington.

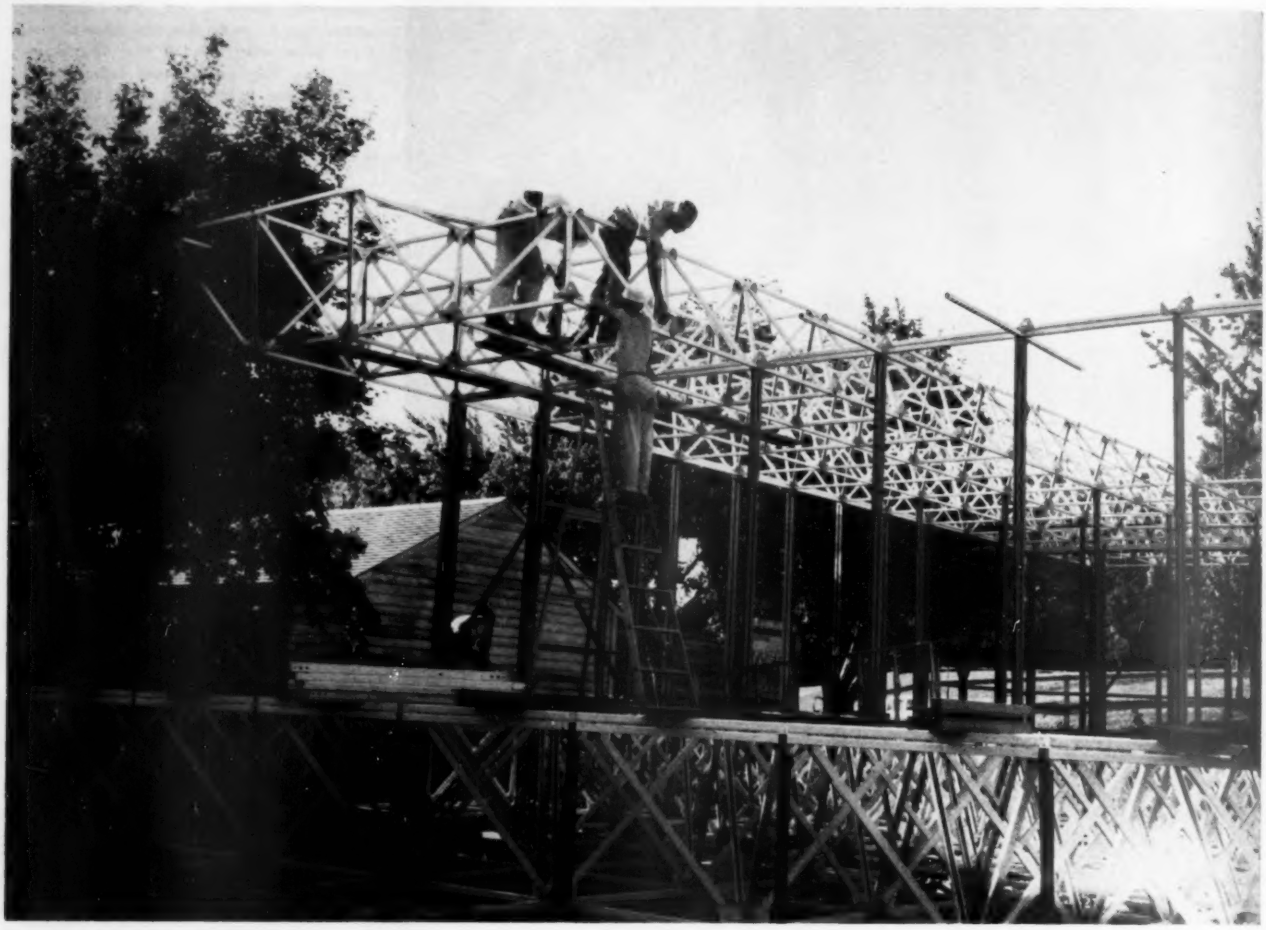
When Dr. Zeno B. Katterle, now dean of WSC's School of Education, came to the college in 1946, he saw the need for a demonstration and display space for new classroom furniture and equipment. The School Research Program, which began on the campus in 1952, seemed to offer the best possibility for getting such a space.

The program was a cooperative project sponsored by the School of Education, the Department of Architectural Engineering and the Division of Industrial Research of the Washington State Institute of Technology. Its purpose was to do research in the field of educational design and environment to support the rapid increase in school building in the Pacific Northwest.

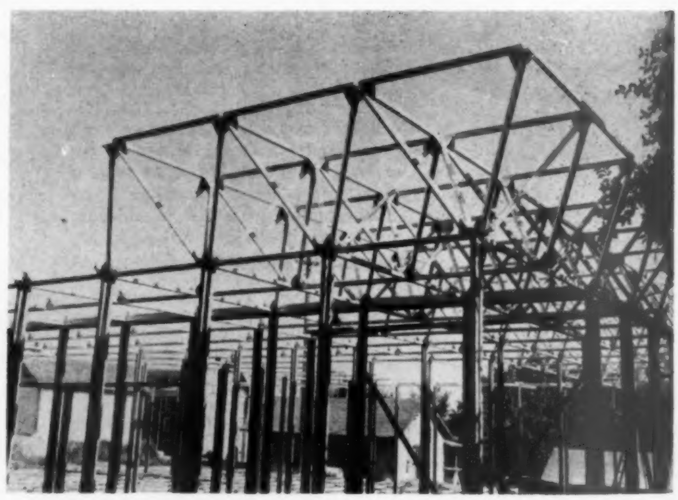
Dr. Katterle broached his idea of a demonstration space to a meeting of the research group in 1954. A quick survey of the campus showed that no suitable space was available. The next logical step was the suggestion that facilities for a display space should be constructed. Following the planting of this seed, the idea of a full-fledged architectural-educational-engineering research laboratory building was born, and the Washington State Regional School Laboratory was under way.

Benefits of the Program

The benefits of a coordinated program in such a building soon became evident. School buildings which display good or bad features of planning, structure, lighting, heating or equipment cannot be moved to a laboratory for analysis and discussion. And, often, ideas of potential value in school buildings must be aban-



Construction of the space-frame roof went rapidly under the enthusiastic attack of the 4-man student crew. Space-frame floor will be used as a crawl space and heating plenum.

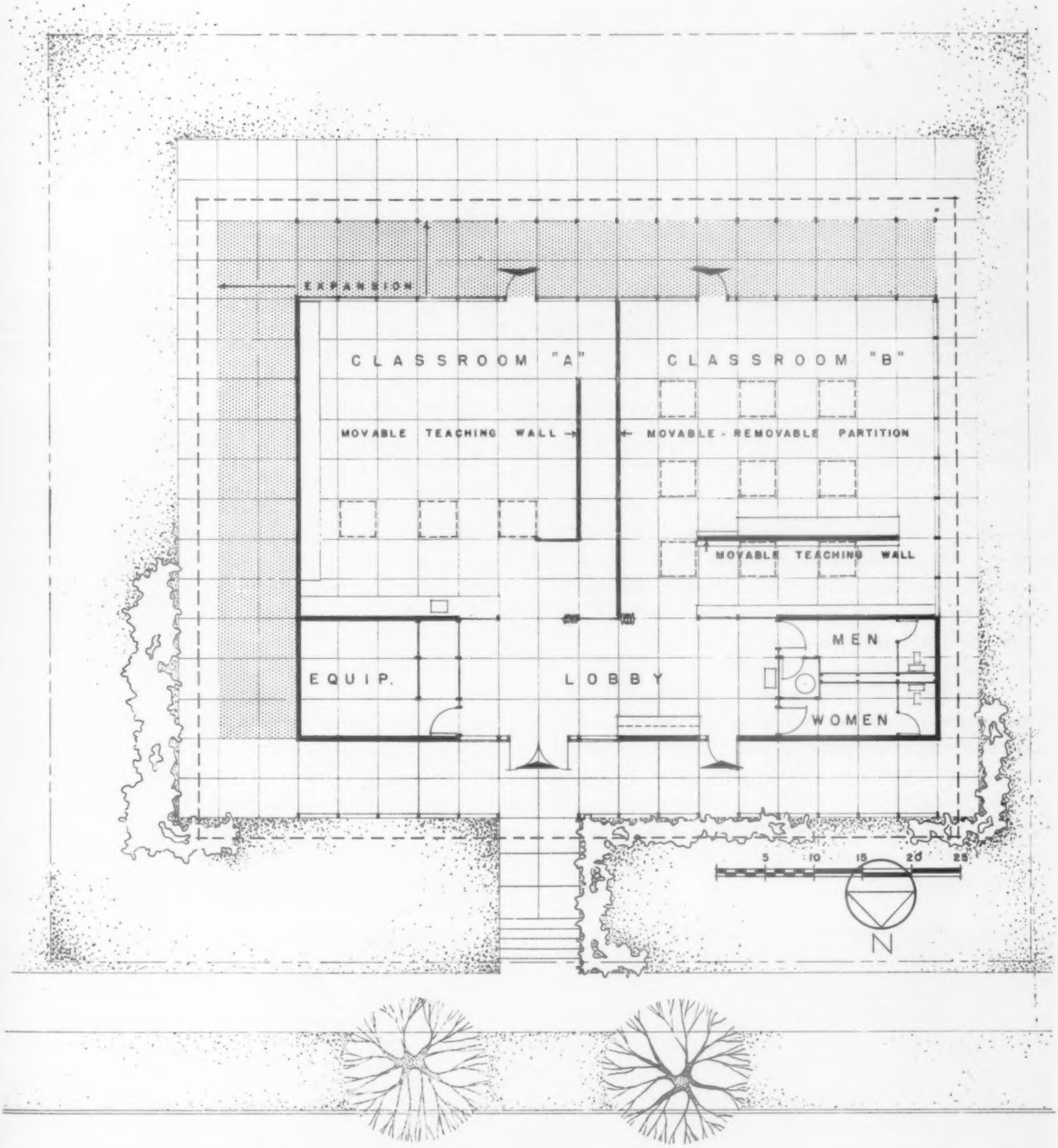


Roof structure depth of three and one-third feet will be used for lighting fixtures, acoustical insulation, ductwork, wiring and other services.

doned for lack of pretesting, or must be tried in actual practice in permanent and costly school jobs.

With three organizations of such different emphasis involved in the School Research Program—architectural engineering, education and industrial research—many aspects of school building design could be investigated in a "school laboratory" building. If the structure were of sufficient flexibility many variations of original ideas could be tested, and answers to existing problems would be sought.

Considerations such as these led to a statement of the scope and objectives of the research program. From this came the program for the design of the laboratory itself. Rather than have a building of fixed dimensions and style, a structure of extreme flexibility was required which could adapt to any demands upon it. The flexible framework which was indicated should be able to make use, at different times, of various floor, wall, ceiling and roof materials, and should lend itself to expansion or contraction with a minimum of effort and skilled labor.



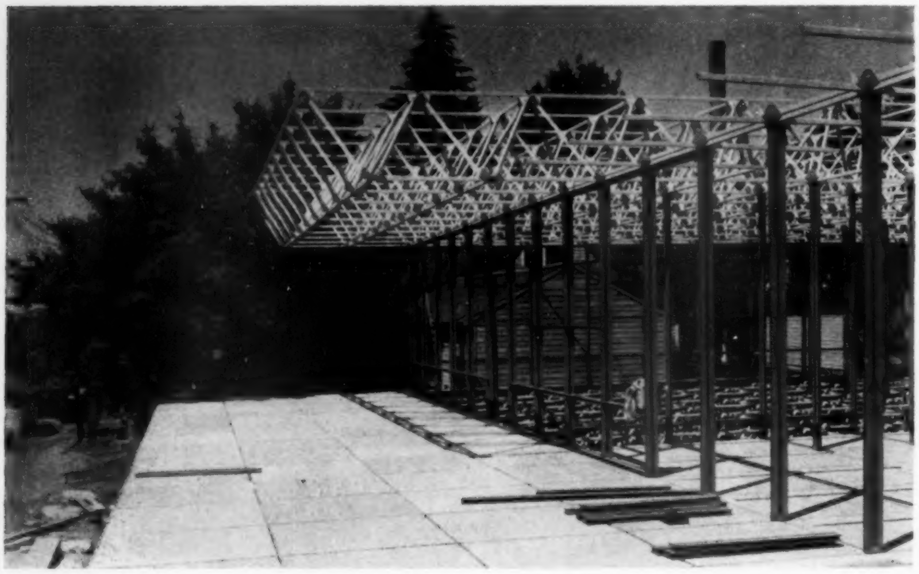
Classrooms A and B may be thrown together, expanded or contracted, and floor, wall and ceiling materials may be changed for unusual flexibility in the study of school planning and building problems in the Washington State Regional School Laboratory.

The Building Is Planned

The Unistrut Corporation of Wayne, Michigan, a private firm actively engaged in construction research particularly in the school building field, was contacted to assist in the development of such a structure using its flexible, bolted steel framing system. Mr. Charles Attwood, president of Unistrut, gave excellent cooperation, even to the extent of agreeing to donate all of the steel framing materials for the structure.

The actual design of the Regional School Laboratory was done by the author during and immediately following a year of graduate study in architecture at the University of Illinois. Several trips to the Unistrut plant and to existing Unistrut buildings in Ann Arbor and Wayne, Michigan, were involved as well as a thorough study of Unistrut principles and detailing. The corporation acted as design consultant during the entire process, checking details and suggesting corrections and improvements.

The building as now designed—the Washington



Ten-foot cantilever along the south elevation permits bolted wall to move out underneath for greater space in the experimental classrooms.

State Regional School Laboratory—consists of a Unistrut space-frame platform, approximately 80 x 70 feet, on which two initial classrooms are being constructed, with an overall size of 65 x 45 feet. The bolted Unistrut construction will allow the building size to be expanded or contracted at will on the platform.

In addition to changing size, the Unistrut system will make it possible to clip in or clip out wall, floor and ceiling panels, windows, doors and perhaps even roof panels. Conditions will be obtainable from completely glazed rooms to totally windowless rooms, skylighted or not, of any size and proportion desired, with various combinations of materials, and a wide range of lighting systems.

Most Materials Are Donated

A majority of the materials required are being donated by manufacturers and suppliers of building materials located in all parts of the country. Naturally, an attempt is being made to utilize Pacific Northwest products. In some cases, it is proving necessary to go farther afield. The interest and cooperation of the building industry has been gratifying and promises a great step forward in the mutual working out of problems in educational design.

Despite the excellent school design work being done cooperatively by the region's educators and architects, there is a need for a focal point of school ideas in the Pacific Northwest. The Washington State Regional School Laboratory is visualized as becoming such a regional center, available to architects and educators of the Pacific Northwest for a number of purposes.

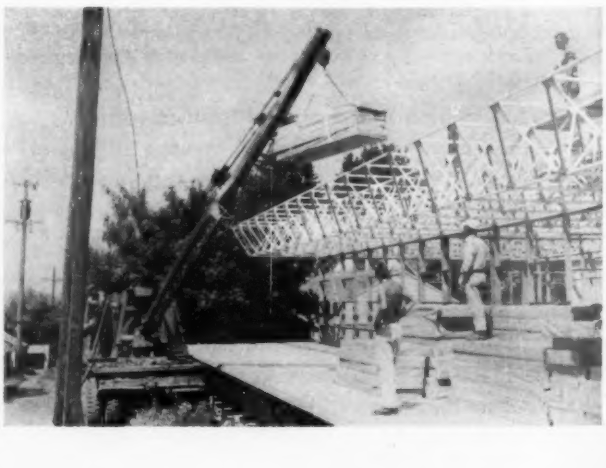
The purposes include the testing and proving of new materials before they are specified for permanent and costly school jobs; experimenting with new lighting systems, both daylight and electric; the checking of optimum room sizes and proportions for various educational purposes; determining room arrangements, uses of space and the best type of furniture and equipment for a given situation; and the study of acoustics, color, heating, cooling, air conditioning and all other influences on the school environment.

This is a big order, and probably will never be filled to perfection. Research, however, by its very nature never reaches an end. The Regional School Laboratory is conceived as a long-term research tool which should add continually to the improvement of the Northwest's educational environment.

Considerable Professional Backing

Because of its potential value to school design and to education, the Regional School Laboratory has considerable professional backing. The Regional Committee on School Buildings of the American Institute of Architects is acting in an advisory capacity, suggesting uses, techniques and goals.

Insulating roof slabs are lifted from the "back porch" to the cantilevered space-frame roof.



Also, from its very inception, the laboratory has had the blessings of the Office of the Superintendent of Public Instruction in Olympia, Washington, the state capital. First Mrs. Pearl Wanamaker and, more recently, Mr. Lloyd Andrews, expressed considerable interest in the project. Mr. Arnold Tjomsland, consultant in school building facilities under both administrations, has offered constant help, encouragement and advice.

Children Will Use the Building

Many of the uses of the laboratory mentioned so far are architectural or engineering in nature. But no reasonable answers could be drawn if the building were operated in a vacuum, devoid of the life which gives meaning to the whole School Research Program. Plans are being made for the School of Education at WSC, one of the sponsoring organizations, to use the Regional School Laboratory as practice and demonstration classroom space. In the words of Dr. Zeno Katterle, dean of the School of Education:

"At present we are in the process of planning a new education building at State College. This building will have several elementary classrooms for regular school. Thus we will have regular students and teachers available on the campus to test development and space studies in this experimental building. Until the new education building is constructed, we will use the laboratory during summers for demonstration classes. Per-

Exterior panels of 3/8" asbestos-cement board are held in place by spring-clip batten strips. They may be replaced at any time. Other exterior wall materials are plastic-coated plywood, low transmission glass and aluminum projected windows.

The 3-inch insulating roof slabs offer structural deck, insulation, finish ceiling and vapor barrier, all in one material. Never before used on Unistrut framing, the slabs are held in place by a metal clip especially designed by architect Darlington and his staff.

manent classes in this building would deter experimentation.

"This building will contribute a great deal as a center for administrators and school board members to study development in school plants. With the flexible plans of the laboratory, it will be possible to demonstrate how physical facilities influence educational functions. Efficient utilization of space is another aspect that will contribute to better school programs.

"This building will be used for teaching school plant planning to graduate students preparing for school administration. It can be used as a laboratory for that purpose.

"There will be 75 to 100 million dollars a year invested in school buildings in the State of Washington during the next fifteen years. Properly training superintendents in school plant planning is an important aspect.

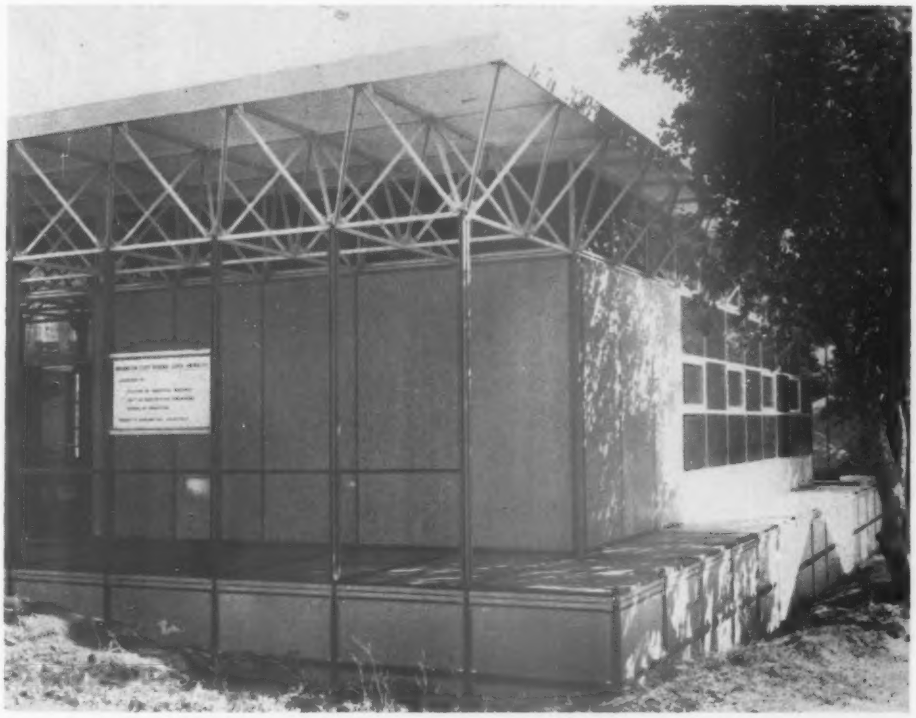
"The experimental building will be used for demonstration teaching in relation to our teacher training program. Proper utilization of space, control of light, heat and air should be part of every teacher-candidate's training.

"I think one of the fine educational aspects accruing from this building is indirect. The cooperation among architects, educators, building materials concerns and researchers is going to result in many improvements in school facilities. When the function of education is better understood, better facilities will result. This, in turn, will contribute to a better educational program."

No Ivory Tower Atmosphere

The sponsors of the Washington State Regional School Laboratory hope that the practicing educators and architects of the region will see in this project a

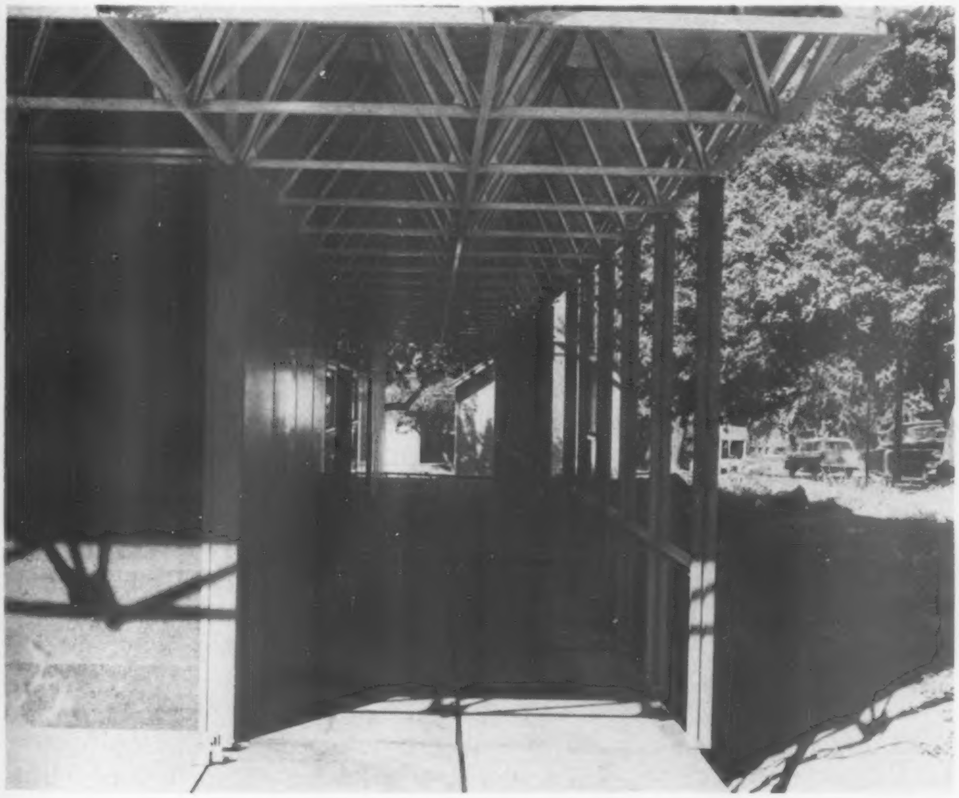
Liquid Neoprene was painted on a 500-square foot test patch of roof deck after the joints had been caulked with sealant. One black coat and one aluminum colored coat were used (see photo at right.) Nine solar-selecting glass block skylights were flashed directly into the built-up roofing of fiberglas "felts" with no curbing. The three plastic dome skylights for other classroom are shown in background, waiting to be set in place (photo below.)



The completed northwest corner, before backfilling, has asbestos-cement skirtboard panels installed around the space-frame foundation. Glazing in the space-frame roof helps balance the interior lighting.

source of potential solutions to their problems. Far greater good will come to education and its architectural environment by the solving of actual or potential problems, than by an ivory tower atmosphere which reaches no farther than the edge of the campus.

Dean Katterle's words show that no ivory tower will exist, and that the laboratory's influence will go out with the graduates of the School of Education. The same will be true of the graduates of the Department of Architectural Engineering and the other engineering departments. Because of the experimental nature of the project, and the unique bolted framing system to be used, an unusual opportunity exists for the participation of the architectural engineering students in the con-



"Front porch" faces the street, giving transition from sidewalks to the school lobby. Floor to ceiling panels on this end of the laboratory are ⅜" plastic-coated plywood.

Interior of the southwest classroom of the Washington State Regional School Laboratory shows cooling effect of the low transmission glass panels. Free standing teaching wall is in the foreground. This classroom was purposely given a glazed west exposure to test methods of sun control.

struction. It is felt that the chance for the students to be involved in the development of a project of such potential value to the Pacific Northwest would be extremely worthwhile as part of their training.

Actual Construction Experience

The initial value to students assisting in the actual construction will be considerable, but the major contributions to architectural engineering students will be realized during an extended period of operation. The extreme flexibility of the structure will enable students to see and to participate in a series of environmental changes and to evaluate the results of these changes.

As problems are posed by architects and educators from all parts of the Pacific Northwest, the laboratory will attempt to evolve solutions for these problems. The students will participate in whatever schemes are developed and tried in the search for answers.

An infinite range of applications to supplement formal class work can be visualized. Architectural engineering students take courses in structural engineering, electrical engineering, plumbing and mechanical equipment involved in heating, ventilating, air conditioning and other engineering subjects. In the Regional School Laboratory they will have the opportunity to observe, work with and analyze a practical, light-weight, three dimensional space-frame roof structure capable of clear spanning large areas in both directions. They will see the practical application of this space-frame to specific classroom situations, and will develop an appreciation of its use for other situations.

Testing Lighting Systems

The student will have a chance to see at first hand the use of different lighting systems and their effect on various classroom environments. The use of visual aids requires different lighting than art work at individual easels or tables; rest period lighting for school children is different than that required for an arithmetic lecture. Different textures and colors of furniture and interior

surfaces will require different lighting systems to provide an optimum visual environment with adequate light, no glare, and a pleasant, non-sterile atmosphere.

The architectural engineering students will experience these varieties of lighting changes and will have opportunities to analyze situations and suggest and experiment with their own solutions. The never-ending question of daylight versus electric light will come in for much consideration in the laboratory, and students will be able to judge for themselves the relative merits of window walls, vision strips, fluorescent and incandescent lighting systems, plastic bubble skylights and solar-selecting glass block skylights, light modulation and much more.

Environment and Human Efficiency

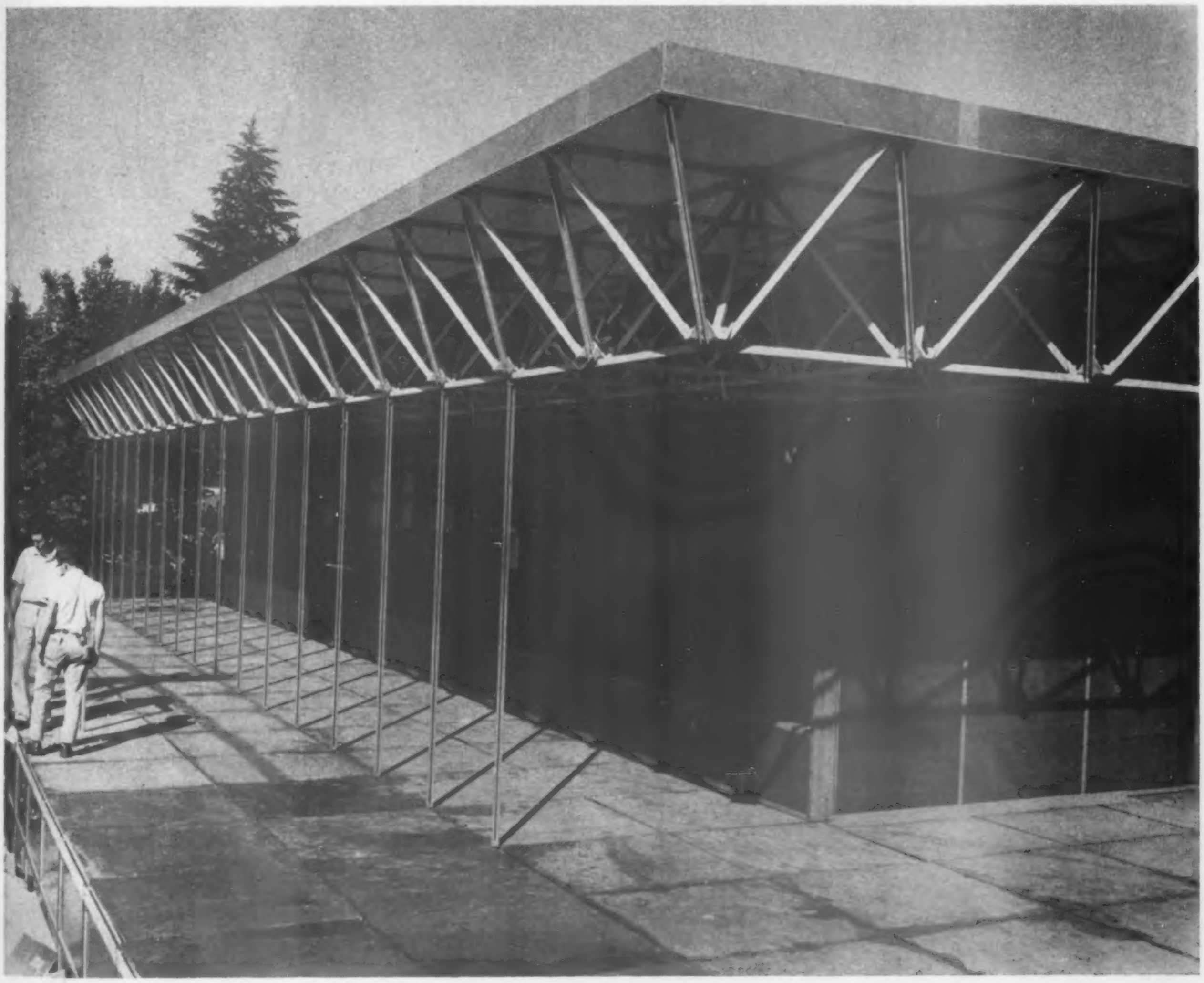
But the visual environment is not the only one to be explored. The effect of temperature and humidity changes on human efficiency is reaching a point of appreciation in architectural and engineering circles which was lacking a few years ago. Recent studies have shown that four or five degrees of temperature difference can make a difference of five to ten percent in the efficiency of a typing student. Typing is a fairly active occupation, and requires a lower temperature for peak efficiency than the study of mathematics or a fairly motionless reading period. Also, children generally require a lower temperature in the classroom than the teacher who, unfortunately, often is the one who regulates the temperature.

Over a period of time the laboratory will explore the effects of various types of heating systems, including warm air, electric, hot water and steam. It is conceivable that experiments can be performed on utilization of solar energy for heating. Air conditioning will be investigated. The various systems will be used successively in the changing classroom situations, giving students an opportunity to observe each in action and to see first-hand the pros and cons of each system in a *specific situation.*

Visualization of Space

There is one use of the Regional School Laboratory

Thin, vertical members under southern cantilever are not structural; they are light framing members to carry various types of sunshades which may be used experimentally to screen classrooms. Plywood floor panels 1 1/8" in thickness, will be anchored to space-frame with batten strips. Water repellent has just been added to them.



which relates specifically to a field of exploration peculiar to the architect. This is the three dimensional visualization of space and its use for human functions, for space is what people live in and move about in and feel about them. Even more than building materials and color and equipment, space is the primary tool of the architect.

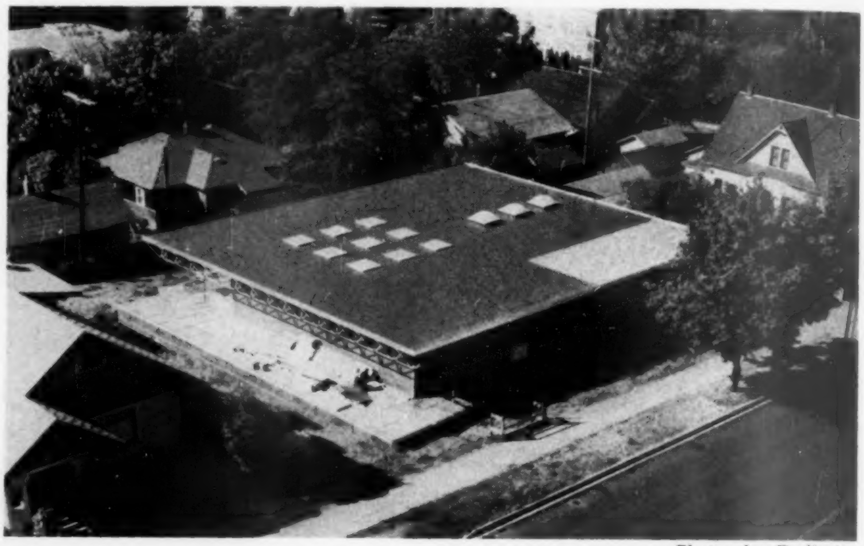
In the laboratory the architectural engineering student will get practical demonstrations of the results of the manipulation of space. Rooms will be expanded or contracted and will change in proportion; windows or the lack of them will change the character of a room otherwise unchanged; colors and textures will change the apparent size and proportions of an interior space, as will variations in the lighting. Here in the Regional School Laboratory will be an opportunity for students to see and to know through experience—rather than to surmise through guesswork and imagination—what is involved in the handling of space.

Construction of the Washington State Regional School Laboratory began in the spring of 1957. Although relatively small in size, the laboratory is large in scope and potential. The aims and hopes of its originators are that its operation will have an influence and value far out of proportion to its size.

An Instrument of Education

It will be an instrument of education on the campus for the architectural, engineering and education students. It will be a tool for research into the new products of the building materials industry. And it will be a source of information and testing for the practicing architects and educators of the Pacific Northwest.

These uses will give the Washington State Regional School Laboratory a unique place in the fields of education and of school building research. The ultimate benefit will be to the region's future citizens, its school children.



Completed exterior of the laboratory stands on a site which is now restricted. Surrounding buildings will be removed eventually to clear entire block for development of the new Washington State College School of Education building.

Photos by Darlington

Moulin Studios

Marin County, California, is the location of the new 126 acre campus of the Golden Gate Baptist Theological Seminary. Campus master plan was executed by architect John Carl Warnecke of San Francisco.

MASTER PLANNING A SEMINARY CAMPUS

by JOHN CARL WARNECKE

AIA, Architect, San Francisco, California

John Carl Warnecke, AIA, attended Stanford University and received his Bachelor of Architecture degree at Harvard University. In his San Francisco and Oakland offices he has a highly talented group of men especially qualified in research and design. Mr. Warnecke's designs for the Mira Vista Elementary School, El Cerrito, and for the White Oaks Elementary School Annex, San Carlos, California, received top awards in the 1951 and 1953 Competitions for Better School Design, sponsored by *The School Executive*.

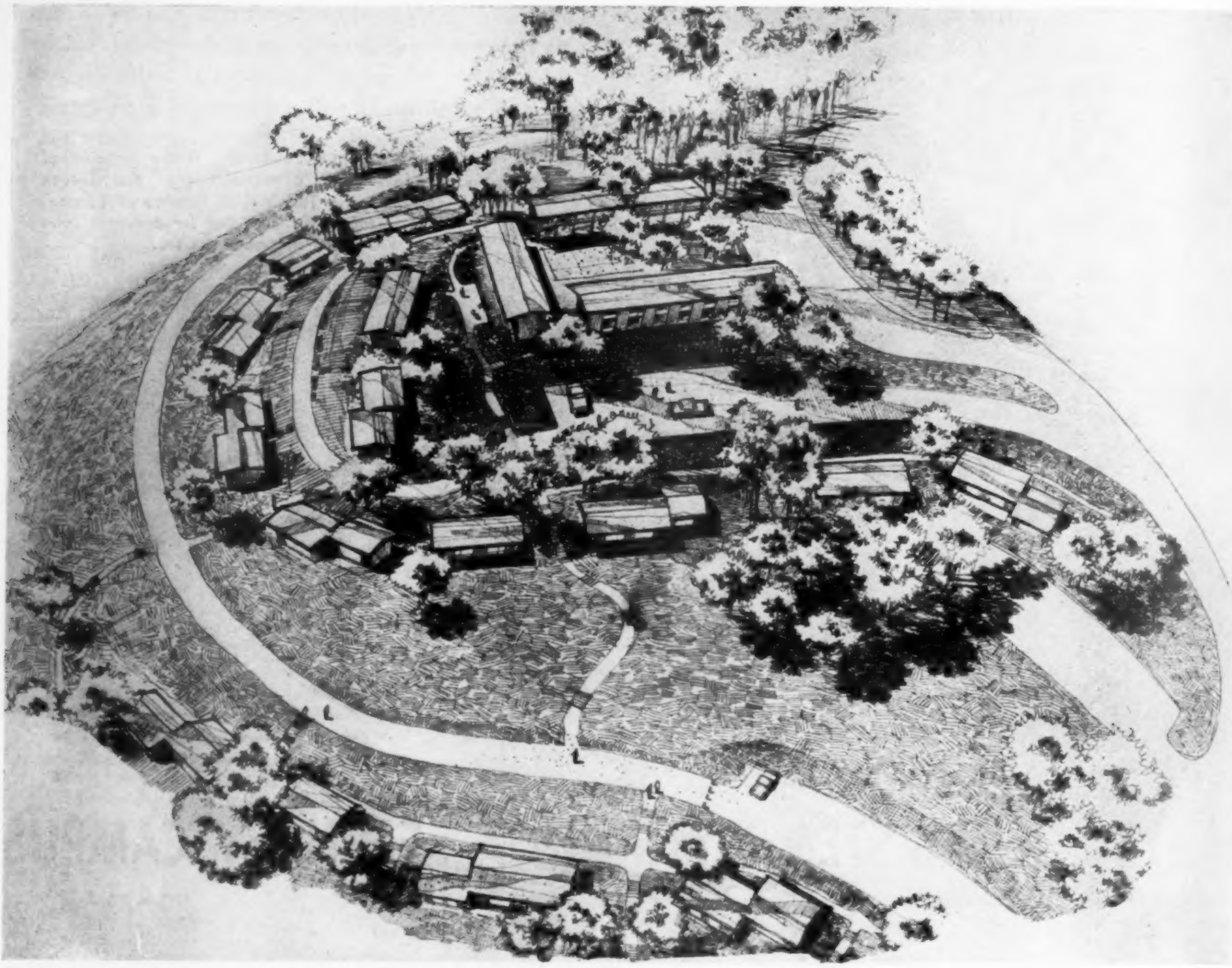
GOLDEN Gate Baptist Theological Seminary is developing a new 126 acre campus in Marin County, California. The architectural firm of John Carl Warnecke, AIA, San Francisco, has completed a master plan for the seminary and the designs of the new structures.

Strawberry Point, Marin County, was selected as the site of the campus after careful consideration of the location, character, climate, population and local services. Strawberry Point is a peninsula of ancient sedimentary rock jutting southward into San Francisco Bay. The contours of the point have been softened by the effects of winter rains and prevailing westerly winds and by the growth of native grasses, shrubs and trees. Left rugged by nature, but softened by time, Strawberry Point represents a typical California hillside translated into a commanding position on San Francisco Bay. The site offers magnificent views over the bay to San Francisco, the East Bay cities and the Marin hills.

The 126 acre site selected is a cluster of heights connected by flowing ridges which descend in gentle slopes to the shores of Richardson Bay, a branch of San Francisco Bay. Justifiably famed throughout the world, San Francisco Bay offers the world's most beautiful physical background for educational institutions. Stanford University and the University of California have their campuses by its shores, and many other distinguished schools and colleges have enjoyed the beautiful views, the interesting weather and the varied topography which the bay determines.

Marin County is generally considered to be the most desirable and unspoiled residential area near San Francisco, although the rugged topography has been a deterrent to the pace of large scale development. The county also offers some of the finest recreational facilities in California. Hiking, camping, fishing, swimming and boating are popular sports in Marin County.

The climate of Marin County is noted for its stability. There is only a 13-degree annual variation in



Living units for students and faculty are arranged in small villages about the site. Each unit, as far as possible, will contain a cross-section of the campus population to insure a variety of backgrounds and interests.

mean temperature between the summer high of 62 degrees and the winter low of 49 degrees. Corresponding data for New York City reflects a variation of over 40 degrees. Over the years, the Bay Area has averaged 138 clear days per year, 128 partly cloudy days and 99 days of rain. The proximity of the ocean provides thermostatic regulation of temperature.

Future County Development

The future development pattern of Marin County is indicated in the Master Plan prepared by the County Planning Commission. A general residential quality is to be maintained with such commercial areas as are required to serve them. Extensive areas are to be kept as recreation and public utilities reservations. Two projects which have been proposed, but which lie in the future, may be of interest. One is a possible barrier across the north end of Richardson Bay to transform a salt slough into a fresh water lake. The other is an ambitious proposal to construct a trans-bay bridge between the Tiburon Peninsula and San Francisco.

The immediate vicinity is zoned for single family residences, with small commercial business nearby. Some distance away and across Richardson Bay, the Sausality tide lots, now occupied mainly by small boat works, are zoned for heavy industry. The shore across the bay to the north is at present zoned for light industry. A strongly backed recommendation by the County Planning Director is to designate this area as a waterfront recreational facility. Currently, funds are being raised locally to match Flood Control District funds for this development.

Growth of Population

The non-institutional population of Marin County has grown gradually over the years to 80,000 in 1950. The decade 1940–1950 was the most significant in this period. The county experienced a growth of about three times that of any previous decade. In this same space of ten years, the population of the nine "Bay Area" counties increased approximately one million (from 1,734,308 to 2,681,321), and today the nine-county total is approximately 3,200,000. By 1970, it is expected to be between 4,000,000 and 4,700,000; by 1990, between five and seven million.

The terrain of Marin County probably will con-

tinue to prevent this area from developing as intensively as the rest of the bay region. There are few suitable sites for industries or other major employment centers.

To the west of Strawberry Point lies the interesting hillside town of Sausalito. Directly to the north is Marin City, a World War II temporary housing development. Because of the poor condition of the structures, the county is demolishing the present housing project. The area is to be redeveloped to include permanent single and multiple residence units, schools and service facilities. Northwest of the Point lies Silva Island, a wooded private residential estate. To the northeast, the land is being subdivided for attractive small homes.

Directly north of the seminary site is Strawberry Neighborhood, a new residential development of attractive, medium-priced homes. The east and west shores and the tip of the point are vacant. Larger, more expensive homes are planned for the coming developments on the east shore and tip. Lots probably will be half an acre in size, and waterfront properties will have private moorings. On the west shore, a hotel and garden apartments are projected.

Transportation and Services

Arterial traffic ways are near the seminary site. Some 30,000 automobiles a day travel U.S. Highway 101 to and from the Golden Gate Bridge, and, though not near enough to present any noise problem, this traffic will have a panoramic view of the seminary across Richardson Bay. Traffic from the seminary site will feed along uncongested neighborhood roads to State Highway 52A and then onto Highway 101 by a new traffic interchange structure. To the north, Highway 101 serves the nearby cities of San Rafael, Petaluma and Santa Rosa; to the south, it enters San Francisco.

Public transit services in use are adequate but, with an eye to future growth, the state and the nine bay area counties have co-sponsored a three-quarter million dollar survey of rapid transit possibilities. It is estimated that the system recommended by the report will cut travel times between Marin County and San Francisco in half. The Richmond-San Rafael Bridge, now completed, provides a much needed auto and bus link between Marin County and East Bay cities.

The Utilities Available

Utilities and services to the site were thoroughly investigated. No easements over the property exist at present. It is contemplated that some minor easements may be necessary for public utilities. Water service will be provided by the Marin Municipal Water District. Mains of sufficient capacity to serve the seminary for domestic and fire protection uses have been installed in East Strawberry Drive.

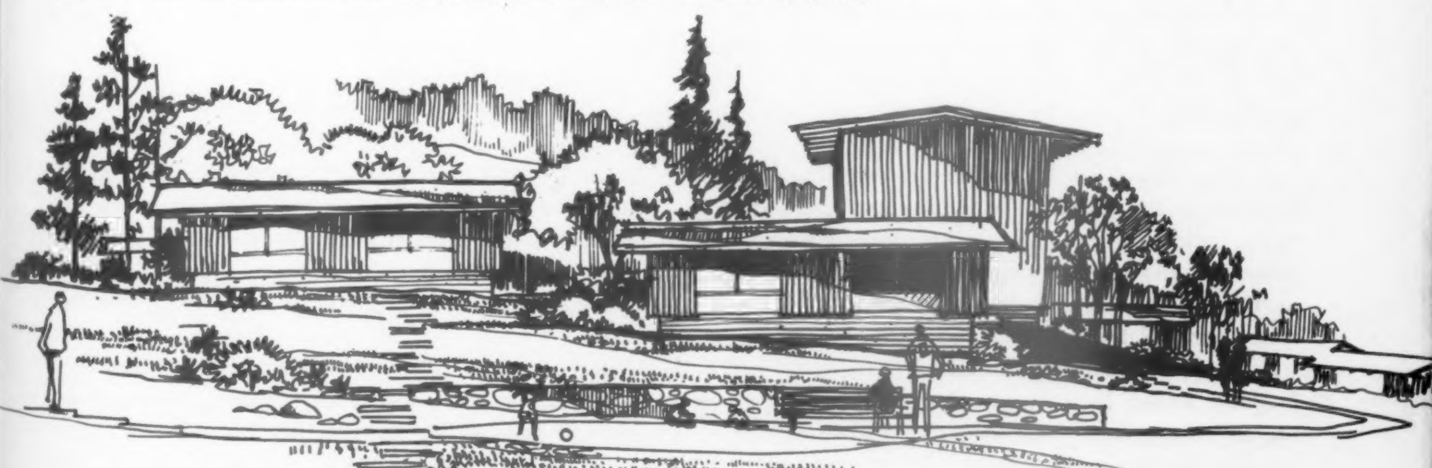
All water mains within the grounds will be installed by the seminary. In order to supply the quantity of water and pressure to meet the requirements of the seminary and future residential developments, the Water District plans to construct a new 1,500,000-gallon reservoir north of the seminary.

All electric power distribution throughout the grounds will be provided by the seminary. Sub-meters for student housing can be provided if desired. All electrical supplies will be installed underground.

Gas service metering will be on a firm gas basis, and it will not be necessary to provide interruptible service with oil burner standby for heating purposes. All gas mains throughout the grounds will be provided by the seminary. No meters for student housing are contemplated. It is felt that a flat charge for gas service is practical.

Sewer mains of the Richardson Bay Sanitary District will be in West Strawberry Drive. The seminary has agreed to construction of sewer mains across its property to serve the future residential section on the tip of the point. Garbage disposal is handled by a private scavenger association contracting directly with the

Dormitory units are planned to fit the topography of the land, with construction by priority.



seminary for garbage pickup service as it is required.

Other Site Considerations

The County Sheriff's office and the Richardson Bay Fire Protection District provide police and fire protection. A fire alarm system will be provided with stations and alarms in all buildings and registers in the fire station and at a central point in the seminary.

Elementary and high schools are all within close range of the seminary campus, and bus transportation for students is provided to all three at the expense of the respective school districts.

An attractive modern neighborhood shopping center has been constructed within a mile of the seminary site. Other nearby centers are planned. A wide variety of shops and professional services is available in Mill Valley, and there are more extensive shopping and service facilities in San Rafael.

Site Development Philosophy

Respect for the existing sculptured terrain is the basic premise behind the site development. Most of the buildings are deliberately subordinated in design and location in order to complement and harmonize with the hillsides, valleys and ridges of the site. The landscaping, too, will be keyed to the native environment and supplemented only where necessary to achieve greater formality in the administrative and academic areas.

This respect for the land is manifested in the distribution of the residence halls along existing contours so the building axes do not conflict with the slopes. Another example of this premise is the deliberate use of existing valleys and folds in the hills to achieve a separation and isolation for each residential village.

To emphasize their functional prominence and to facilitate access, the major academic buildings are laid out on existing ridge lines. The topography of the existing site has been consciously used to emphasize the relative importance of the different buildings and to achieve a harmony and implicit cooperation between the original ground and the new system of buildings.

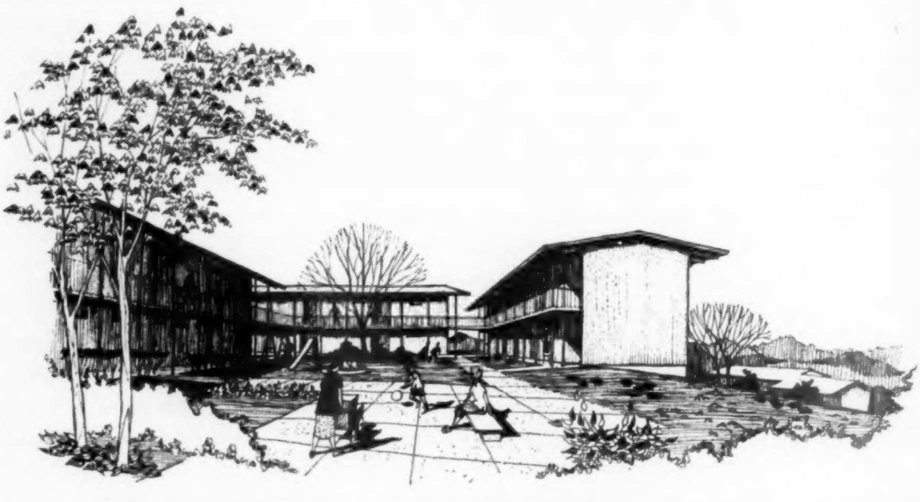
Architectural Procedure

Following the selection of a site and detailed studies of the environment, an "Outline of Procedure" was formulated with the assistance of Lawrence Livingston, Jr., regional and city planning consultant, and Drs. James MacDonnell and William Odell, educational consultants. This outline specified the factors and elements which were to be studied and a sequence for their consideration.

The next phase of program development was an invitation from the architect to Dr. Graves, president of the seminary, and his colleagues to submit written opinions on the role and function of the seminary.

It was hoped that opinions from leading Baptist laymen and clergy would clarify the basic goals of the seminary and suggest the tone and mode for designs which would produce a favorable intellectual, spiritual and social climate for a theological student's growth.

The responses to this invitation were prompt. The thoughtful comments of the respondents were of great assistance in communicating to the architects the spirit and sympathetic understanding so necessary for any successful religious building.

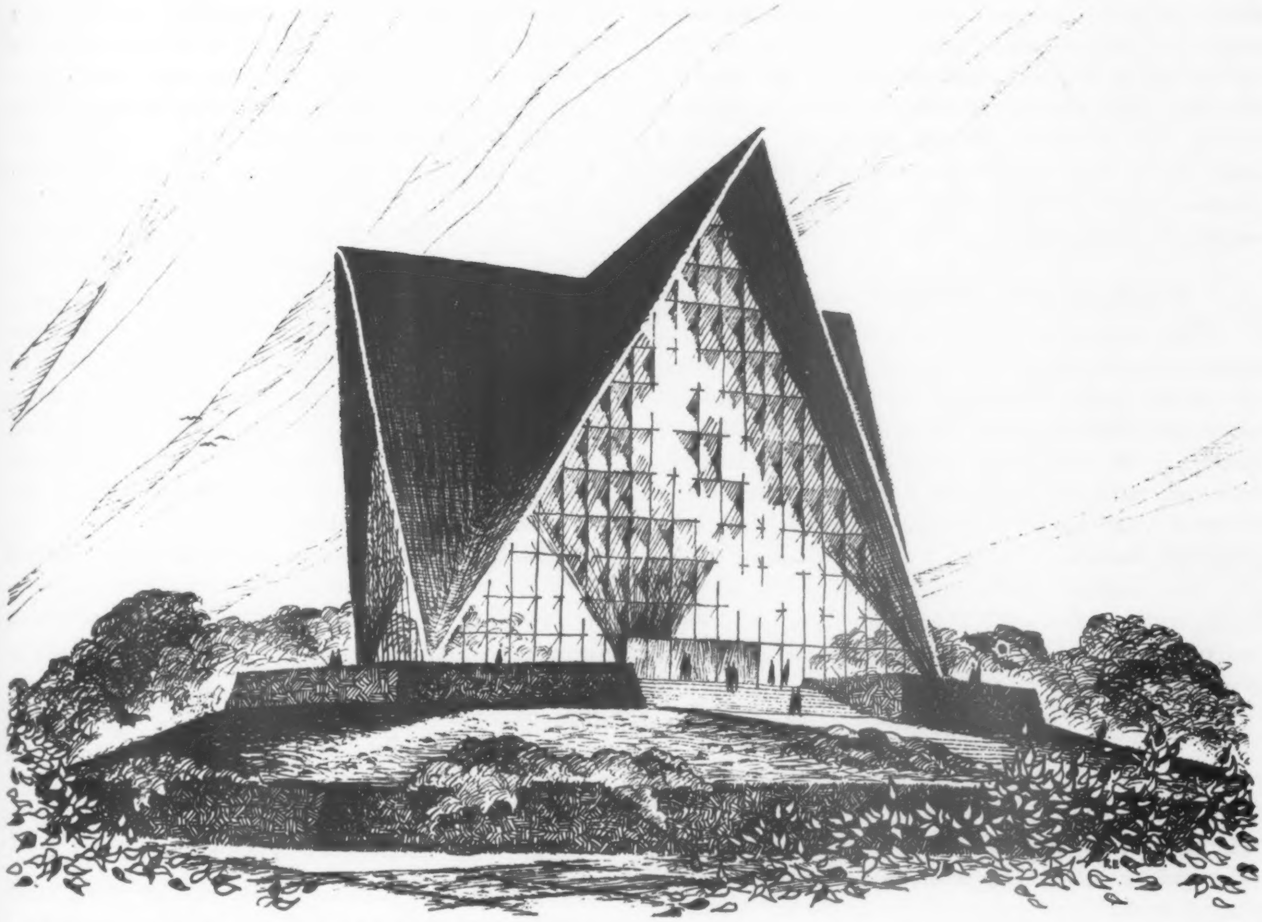


Perspective of a village unit is complete with provisions for children's play areas. Housing will be provided for married couples without children, with one child, and with two or more children.

General Program Requirements

It was determined that current facilities should be planned for an enrollment of 1,000 with sufficient capacity for a 50 percent expansion. Drawing on the experience of the Southern, Southwestern and New Orleans Seminaries, the typical distribution of students among curriculums was estimated to be 700 in the Theological Department, 200 in the Religious Education Department, and 100 in the Sacred Music Department.

Housing was required for single and married students as well as for resident members of the faculty and staff. The requirements were summarized and computed on the basis of 1,000 students. The breakdown



Sloping eaves of the chapel will be finished with mission roof tile. This is a native material with an important place in Spanish architectural traditions in California.

of student body into categories for housing study was as follows:

Single men in total number	20%
Single women in total number	10%
Married students in total number	70%

It was estimated that 700 students would be housed on site. These would include:

All single men (ultimately)	200
All single women (immediately)	100
Married students	300[1]

An analysis of housing needs for married couples was computed on the basis of 300 couples:[2]

Couples without children	30% of 150–45
Couples with 1 child	20% of 150–30
Couples with 2 or more children	50% of 150–75

[1] An estimated 60 percent or 420 of the total 700 married students are to be housed on site. Dr. Graves estimates that 300 married couples will need apartments. One hundred fifty units will be required in the first stage.

[2] A certain proportion of married students will live in their local church districts and for this portion of the student body the seminary has no housing responsibility. Others will live outside voluntarily.

Supplementary housing needs to be considered include the president's home; faculty housing (to be considered only in terms of land use, requiring a subsequent special phase of study); apartment building for certain members of faculty and administrative staff; house of superintendent of grounds; residence for missionaries and their families (this is in the last category to be considered); guest house.

Priority of Housing

The priority of housing construction necessary to function on the new site was determined in this order—residence halls for women; residence halls for men (residence hall accommodations for couples in lieu of apartments could also be utilized. This construction would be flexible for use to greatest advantage in the early stages of building. Separate residence halls for men and women are the final requirement); apartments for couples with children (made obligatory by existing local conditions).

Parking space was provided for daily needs and for peak loads, including visitors.

After a careful analysis of the seminary program, a functional diagram was prepared which indicated schematically the relationships among the various aca-

demic, religious, administrative and residential components of the seminary. On the basis of this diagram, various areas and individual buildings were fitted to the site so that convenient relationships were obtained among the academic, administrative and residential areas. From these site studies and from the detailed program requirements, a final, complete and detailed master plan emerged.

Academic and Administrative Group

The location on a high knoll of the group of academic and administrative buildings sets them off visually as the heart of the seminary. A central mall leads along the ridge from the chapel and defines an axis flanked by the classrooms and administration building and terminated by the library building. The academic group is completed by the recital hall which adjoins the classroom building.

The residence halls are located on an adjacent knoll, north of the academic group, with the student union and cafeteria forming a link between the two groups.

Chapel Is Focal Symbol

The chapel is the single exception to the program of land dominance. Because of the great importance of this building, its site was selected on the highest and most prominent hill. This central location reinforces the chapel as the focal symbol of the goals and ideals of the seminary.

The hill-top location also permits the chapel to be seen from many surrounding points in the bay area. In keeping with the traditions of ecclesiastical architecture, the dominant form proposed for the chapel is a triangle which carries the eye upwards as does a spire. Each side of the building is comprised entirely of a large triangular window. This lack of any one dominant orientation in the structure emphasizes the open, democratic character of the Southern Baptist traditions—open to all while favoring none.

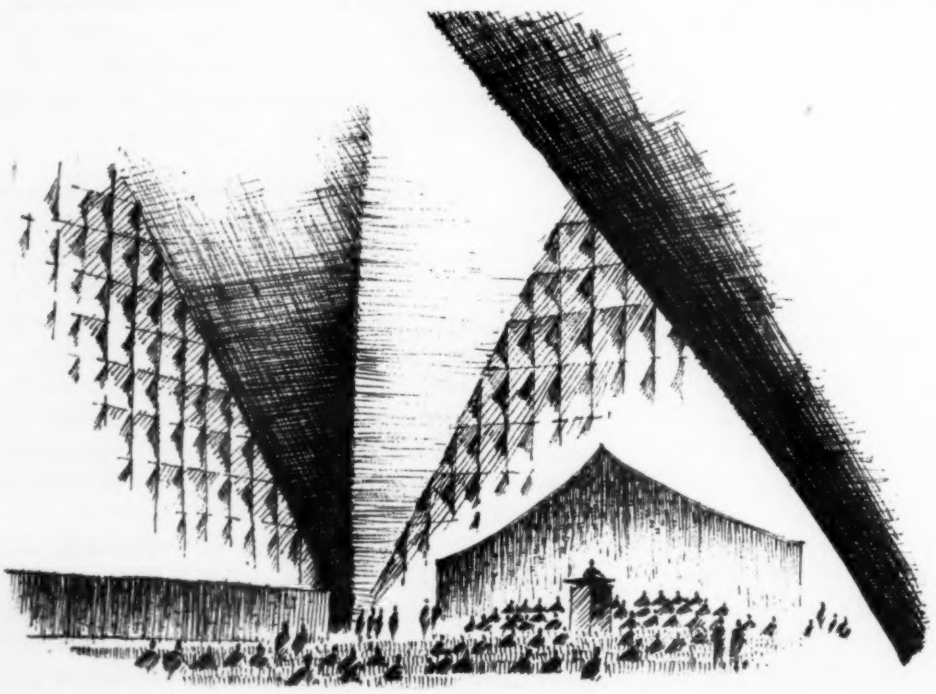
The chapel is turned outward both by its location and design. The stained glass proposed for the window systems, unlike that in traditional churches, is designed to be viewed from the outside with internal lighting, as well as from within. The chapel is thus a double symbol of the seminary. For those inside, the great windows and the unparalleled view admit the glory of the external world. To those on the outside, the building is a glimpse of the spiritual force which gave it being and which is symbolized in turn by the great upward movement of the structural planes which comprise the very structure of the building.

Ornamentation is not conceived as being external to the building or as mere added embellishment. It is proposed that the structure of the four great windows be integrated with the sculpture achieved by planes of colored glass and steel members. The whole structure—the roof vault and the windows—is intended as a single, refined statement of the purposes and aspirations of the seminary.

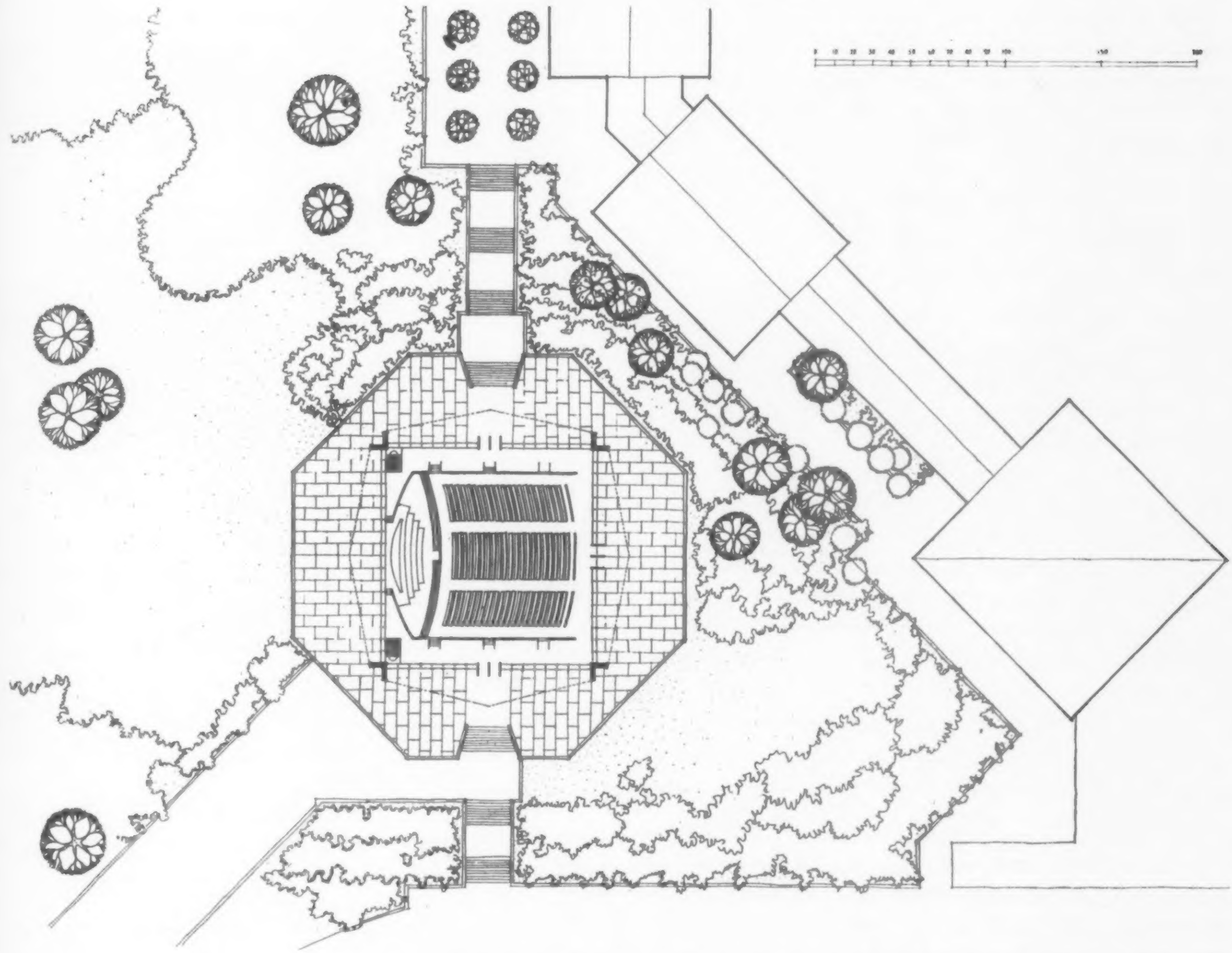
Residential Facilities

In developing the program, it was determined that three types of residential facilities would be required:

1. Residence halls for single men and women students
2. Apartments for married students without children
3. Larger apartments and duplex units for student families with children



Each side of the chapel is composed of a large triangular window of stained glass which permits viewing from inside or outside the building.



Chapel interior is planned with triple rows of seating centered beneath the vaulting arches.

The residence hall group consists of one and two story units integrated with open, landscaped courts. A pedestrian bridge over an access road connects the hall and the cafeteria. A fully equipped infirmary is located at one end of the women's residence hall. In the halls are also located a nurses' quarters, a six-bed men's ward, a three-bed women's ward and waiting and examination rooms.

Student and Faculty Villages

Living units for students and faculty are arranged about the site in small villages. The large number of dwellings is divided into several small groups to achieve the desired informal campus atmosphere. Each village is located to take advantage of some particular view of the terrain. A system of contour-tracing roads describes the perimeter of the grounds and winds its way among the groups of buildings.

Particular care was taken to diversify the size and character of the various residence halls and residential villages for easy social and intellectual interchange among the students. In this way, they might educate each other in the pervasive way that accompanies group living. As far as possible, each unit will contain a cross section of the campus population to insure a maximum variety of temperaments, backgrounds and special interests. Such variety has a strong and positive educational value, for it can enlarge viewpoints and encourage tolerance.

Rather than build large residence halls so common on other campuses, an attempt was made to reduce the scale of individual units. In addition to the social and educational advantages of small, flexible units, it was thought appropriate that each residence or apartment might result from the generosity of a single donor or small group of donors. There is no better way to further the work of the ministry and express confidence in its future than to endow a building that will provide a home for a minister's family during crucial early years.

Materials and Methods

Economy and quality were obtained by adapting the best elements of current construction techniques and materials. Wood, masonry and colored aggregate secure the warm, residential tone so typical of expensive California homes, and at the same time share the economies of large scale residential construction.

We are convinced that these methods produced

almost one third more housing than could otherwise be obtained for the same money. We also believe that with responsible maintenance from mature students the apartments and houses will long retain their appearance and usefulness.

Parking and Circulation

The parking space for the institutional program has been provided in several ways:

1. A central parking lot is planned which will be terraced along the hillside and heavily screened with major plantings. This central lot is designed primarily for those coming from outside the campus community on business or to attend special events. It provides convenient access to the major buildings of interest to the visitor.
2. Student parking is provided in lots located near each of residential villages and near the residence halls. It is assumed that daily traffic on the campus will be pedestrian, and paths and trails are provided to link the villages with the major building groups.
3. Faculty and staff parking will be located in lots near the academic and administrative buildings. Sufficient spaces are provided so that each staff member might have a reserved parking space.

Circulation roads are laid out in general conformity with the contours of the land. No effort is made to emphasize the roads nor to overstate the large parking areas. Screen planting and the use of terraces reduce the visual impact of the parking areas and keep them compatible in scale and character with the terrain and the buildings which they serve.

Along the main approach road is the largest level area on the site. This has been designated as recreational space. The large green expanse, unobstructed by high planting, will form a pleasant foreground for the buildings beyond. A gymnasium building and swimming pool will be set against the hill adjoining the playfields.

Architectural Form and Materials

The architectural character of the buildings was a subject of intensive thought and discussion, and the most suitable building forms and materials were studied. It was hoped that the effects created by form, texture and color would be a logical continuation of the planning concept. During these studies consideration was given to three major factors: utility and economy of maintenance; seminary traditions; and character of the site and regional architecture.

These considerations and a study of materials locally available at reasonable cost resulted in the following general program for use of materials.

Chapel and Academic Units

Floors: Concrete slab on grade with asphalt, rubber and cork tile.

Walls: Concrete, light curtain partitions of wood, glass and modular wall panels. Rock walls are used in landscaping.

Roofs: Mission roof tile. Sloping eaves with warm tile were adopted to avoid the dullness of flat, tar and gravel roofing. The tile is also a native material with an important place in Spanish architectural traditions in California.

Residence Halls and Housing

Floors: Ground floor slab on grade, upper floors, wood. Finish flooring wood, asphalt tile and cork tile.

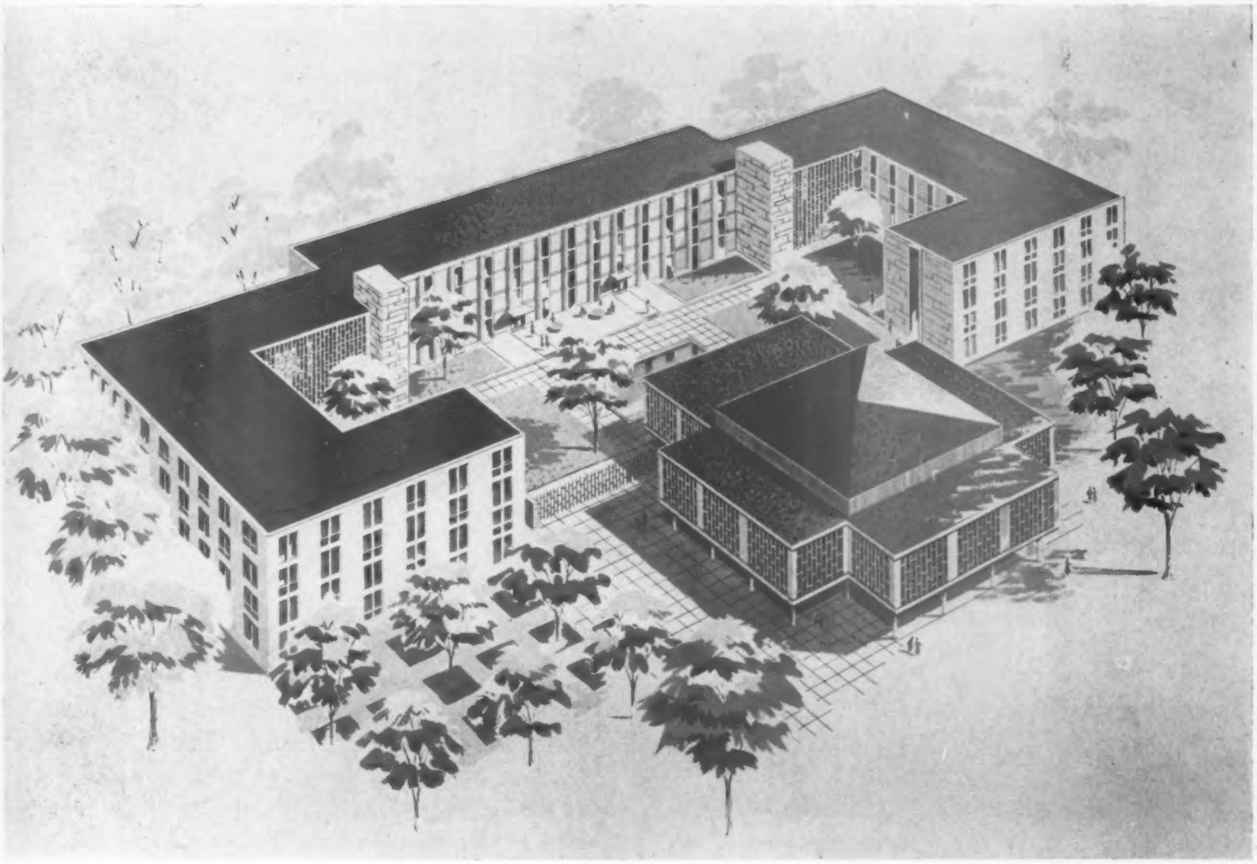
Walls: Wood framing finished with wood or gypsum board. Ceramic tile in bathrooms.

Roofs: Built-up composition roofing over wood.

Plan forms and exterior treatments were conceived as direct expressions of the functions to be served. Similarity and compatibility of form and materials are employed to create a feeling of unity among the various units. The general progression of form culminates at the high steep roof vaults of the chapel.

The simplicity of contemporary architecture is reflected in the plans of the units. Great variety of feeling is attained through the interrelation of living areas and continuous landscaped yards. Care was exercised to give everyone the benefit of the various panoramic views at hand. In units for families with children, play areas were planned to be seen easily from the kitchen.

The seminary as a whole achieves unity among the buildings and groups, as well as with the site, while showing attendant consideration for economy, tradition, function and character.



Quadrangle was designed by Eero Saarinen and Associates, with J. Lee Jones consulting architect.

UNIVERSITY OF CHICAGO'S RESIDENTIAL QUADRANGLE FOR WOMEN

by J. LEE JONES

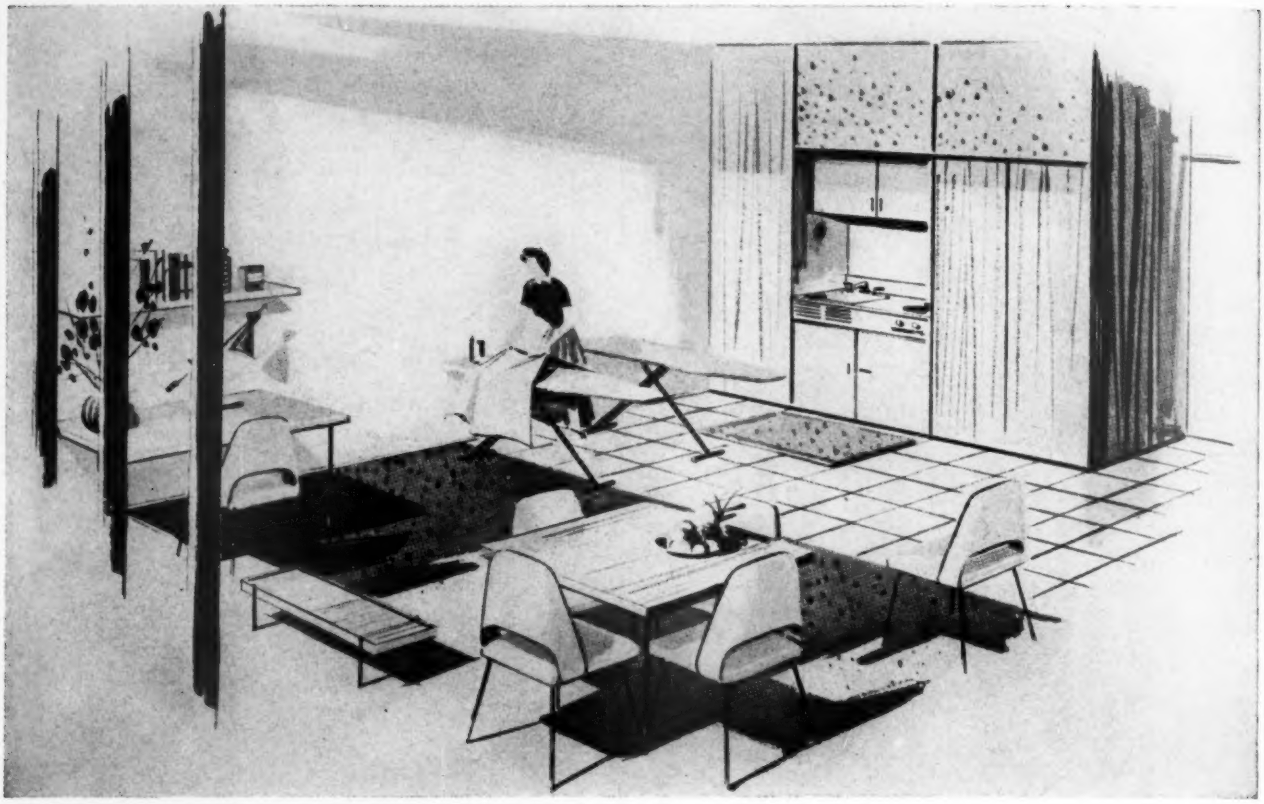
AIA, Consulting Architect, University of Chicago, Chicago, Illinois

J. Lee Jones was graduated from the University of Illinois School of Architecture, and later attended Lake Forest College for two years. He was associated with the Lake Forest, Illinois, office of Anderson and Tichnor from 1932 until 1942. In that year he came to the University of Chicago. Subsequently, Mr. Jones has worked with the office of Ralph Stoetzel and as an associate of James H. Tichnor of Glencoe and Stanley Anderson of Lake Forest. He was named consulting architect of the University of Chicago in 1948.

GROUND was broken in June, 1956, for the first new dormitory for women students constructed at the University of Chicago since the Spanish-American War. The $3,690,000 quadrangle has three connecting residence units to house 512 students. The residence halls are four stories high with a basement, and face a central court.

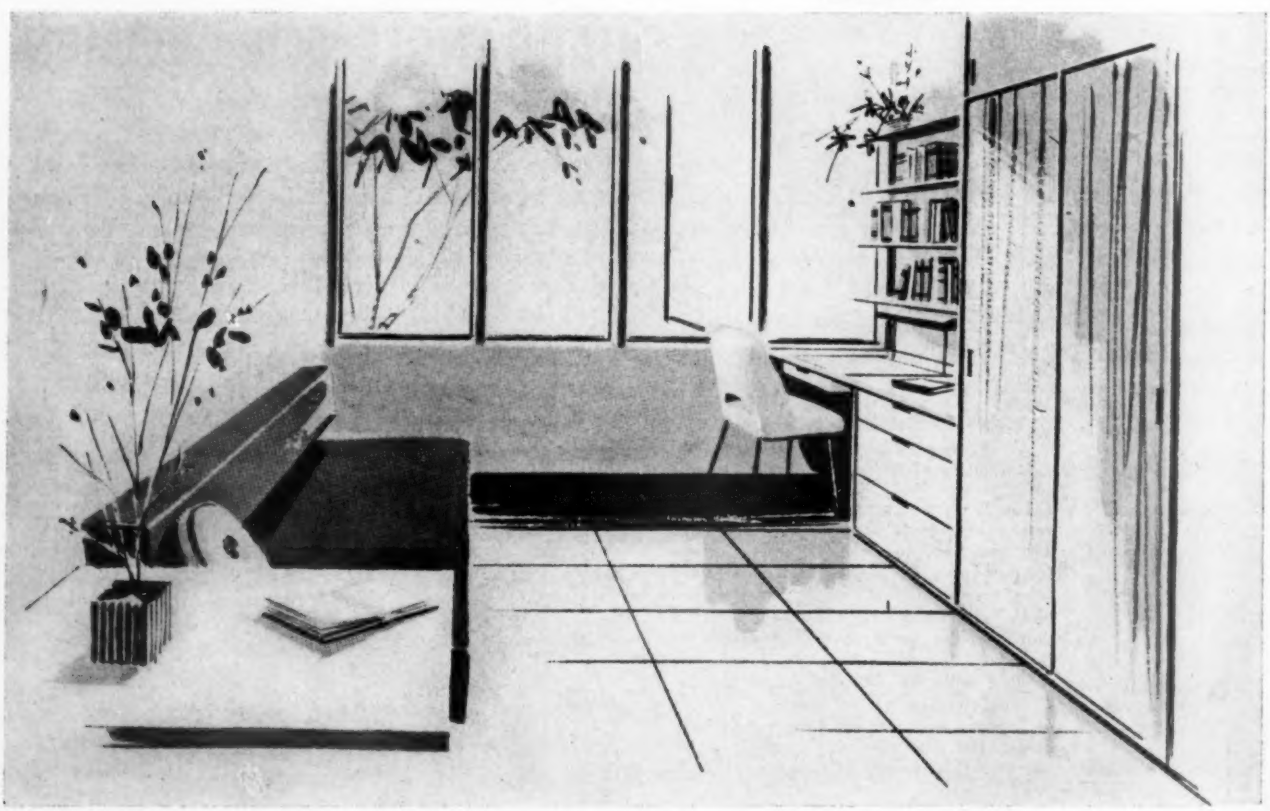
Common to the three housing sections is the food-service unit, located in the central control area. The residence quadrangle was designed by Eero Saarinen and Associates, Bloomfield Hills, Michigan, consulting architects to the university. The associate architect was J. Lee Jones, also consulting architect of the university.

Existing dormitories for women at the University of Chicago campus are obsolete and inadequate, and house less than 40 percent of the women now in attendance. Planned for modern living, the new resi-



Architect's sketch of the recreation and general utility room in the new dormitories shows the recessed kitchen. Ironing facilities are provided for residents of the new quadrangle.

Single study-bedroom has a bed that doubles in daytime as a couch. Furnishings also include a large sliding door wardrobe, desk and wall hung bookshelves.



dence halls incorporate the latest ideas in design. The division into three units gives the students a maximum amount of small group living, yet permits high operating efficiency.

The Residence Hall Facilities

The residence halls contain 60 single rooms and 226 double rooms. Each unit has its own social center lounge on the first floor, with an adjoining kitchenette. Each section also has a guest room and bath for visiting relatives, and a proctor's apartment.

In the basement areas general utility and hobby rooms are provided for recreational activities, with card and ping pong tables, record players and kitchenettes. Two typing rooms, two music practice rooms and storage areas for extra clothing and trunks are also located in the basement of each unit.

Entrance Through Central Unit

Entrance to the residence quadrangle is through the central unit which contains the dining hall, kitchen and reception lounge for visitors. Construction of the central dining and kitchen unit is not expected to be completed until after the residence halls are ready and occupied. Adjacent Ida Noyes Hall, a clubhouse, will serve the quadrangle residents until the dining section is built.

The dormitories are of reinforced concrete frame and flat slab construction with exterior walls of rough shot sawn Bedford limestone having warm brown coloring. The base is large panels of precast concrete and random shaped limestone, designed and developed by Mr. Saarinen. Windows are aluminum with the building coping, spandrels and sills of porcelain enamelled aluminum. Although functional and modern in design, the building blends well with the Gothic design of earlier university structures.

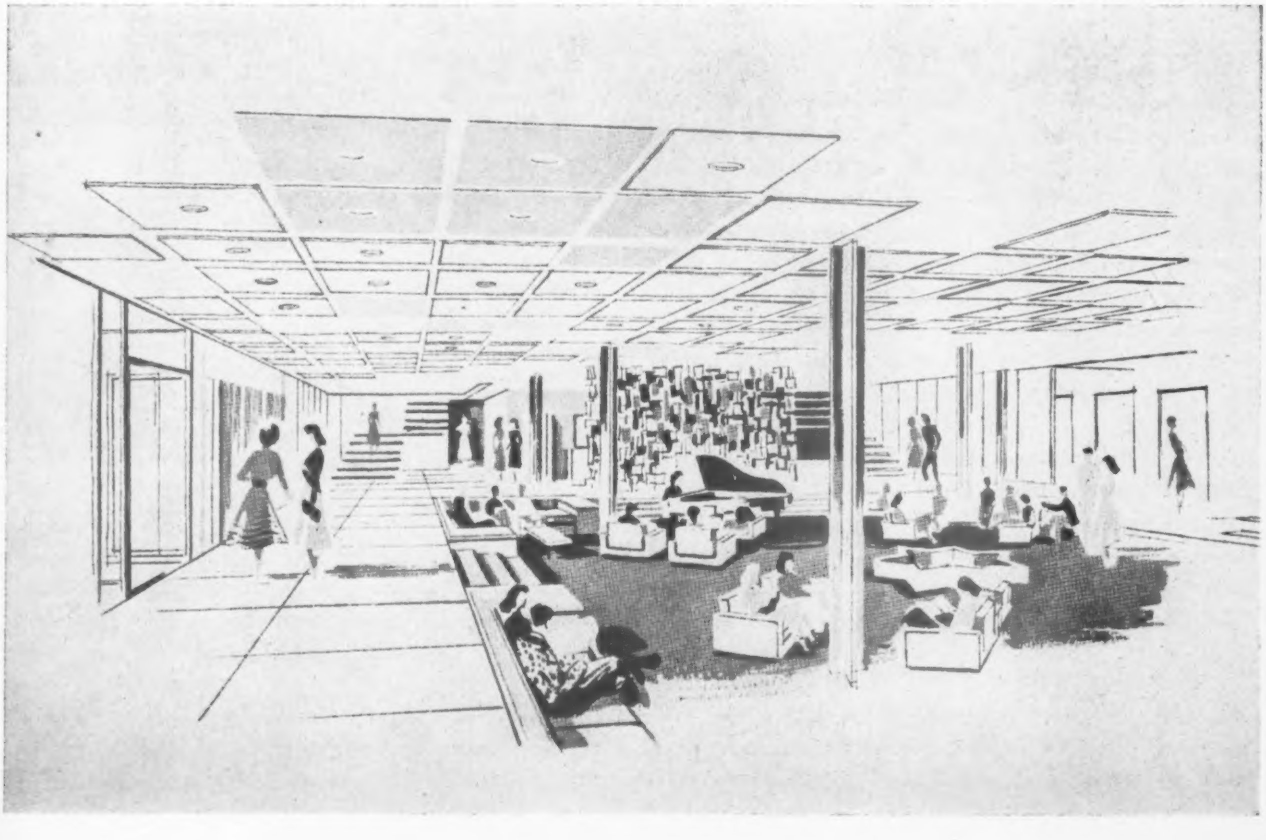
Floors, Walls, Ceilings

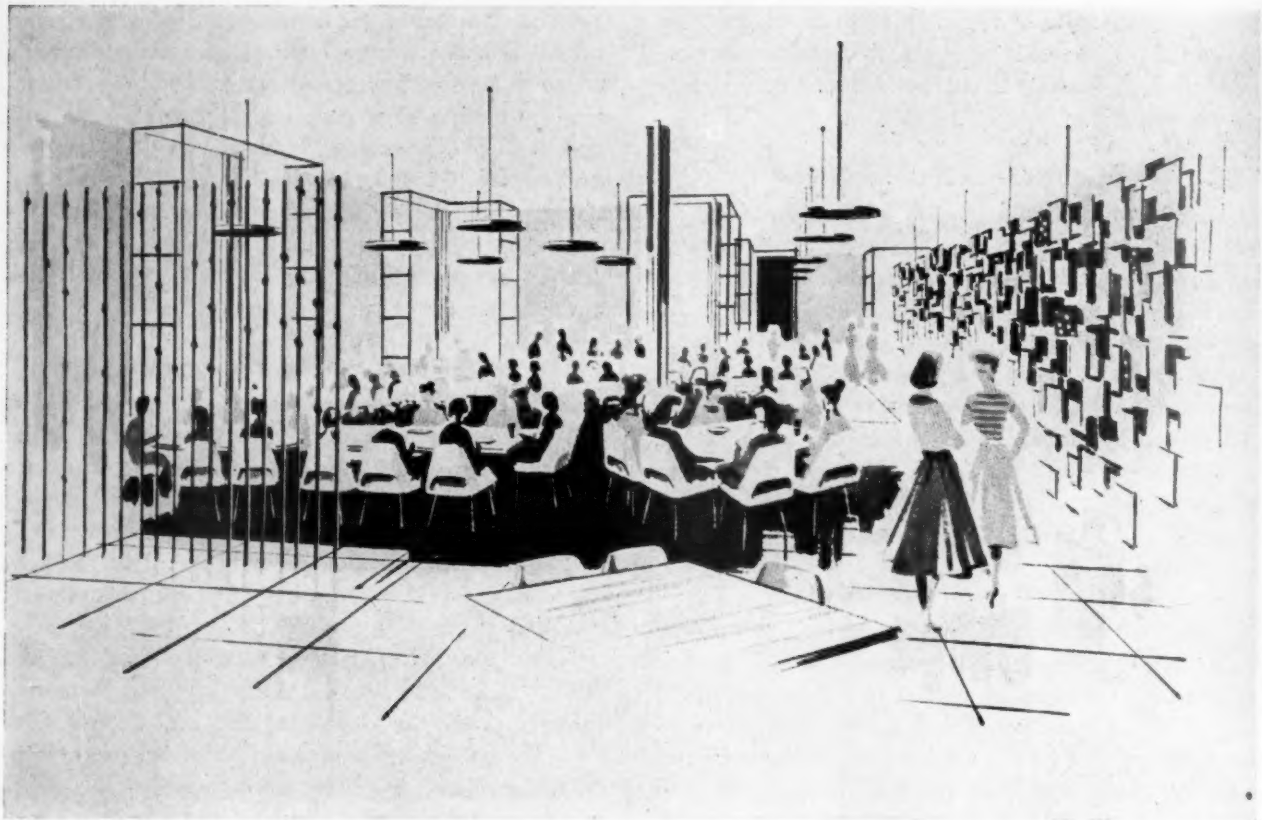
The concrete floors are finished with asphalt tile in the residence rooms and vinyl asbestos in the public areas and corridors. Walls and floors in the baths are ceramic tile. In the dormitory rooms walls are painted concrete block, with plaster walls in the lounges. Ceilings are exposed concrete painted, except in the halls and public rooms where an acoustic tile treatment is added.

The general contractor for the building was the George Sollett Construction Company; the consulting engineers were Severud-Elstad-Krueger of New York City; the consulting mechanical engineers were Samuel R. Lewis and Associates of Chicago.

Interior design of the lounges and a built-in couch arrangement are by the architects, Eero Saarinen and

Interior design of the lounges of the new residential quadrangle for women students at the University of Chicago was by the architects, Eero Saarinen and Associates of Bloomfield Hills, Michigan.





Central unit of the quadrangle contains the dining hall (see above) and the kitchen and reception lounge for visitors. Construction of this unit will not be completed until after the residence halls are completed and occupied.

Associates. The university is selecting the balance of the furnishings.

A Major Objective

The University of Chicago has few more pressing needs than additional housing for women students. It is hoped that the new residence quadrangle will help to take care of present needs and part of the increased enrollment anticipated in the years to come. The university is currently campaigning for $32,700,000, and one of the major objectives of the fund raising is for new residence halls for women.

Air view of the University of Michigan North Campus shows the Northwood Apartment development in the foreground. Northwood group one is in the center, group two is below and at the right.

UNIVERSITY OF MICHIGAN'S MARRIED STUDENT HOUSING PROJECT

by FRANCIS C. SHIEL

Manager of Service Enterprises, University of Michigan, Ann Arbor, Michigan

Mr. Shiel joined the staff of the University of Michigan in 1925. Since 1933 he has directed various phases of student housing with responsibilities in building planning, buying equipment and maintenance. He was business manager of the residence hall system for 12 years. In 1951 Mr. Shiel was appointed manager of service enterprises. He is a member of the Advisory Committee, College Housing Program, U.S. Housing and Home Finance Agency.

INCREASING numbers of married students in graduate and professional programs at the University of Michigan have made it necessary to provide adequate, yet inexpensive rental apartments for student families.

On the university's North Campus the Northwood Apartments have been constructed to make available 396 housing units. Arrangement of the 41 buildings in courts and six service buildings over a 40 acre section of the campus affords large open green space, ample parking lots and protected play areas.

Accommodations offered in Northwood are 40 efficiency (no bedroom) apartments, 256 one-bedroom and 100 two-bedroom apartments. Rentals are $80, $90, and $105 per month respectively. This includes basic furnishings, heat and utilities, except telephone service.

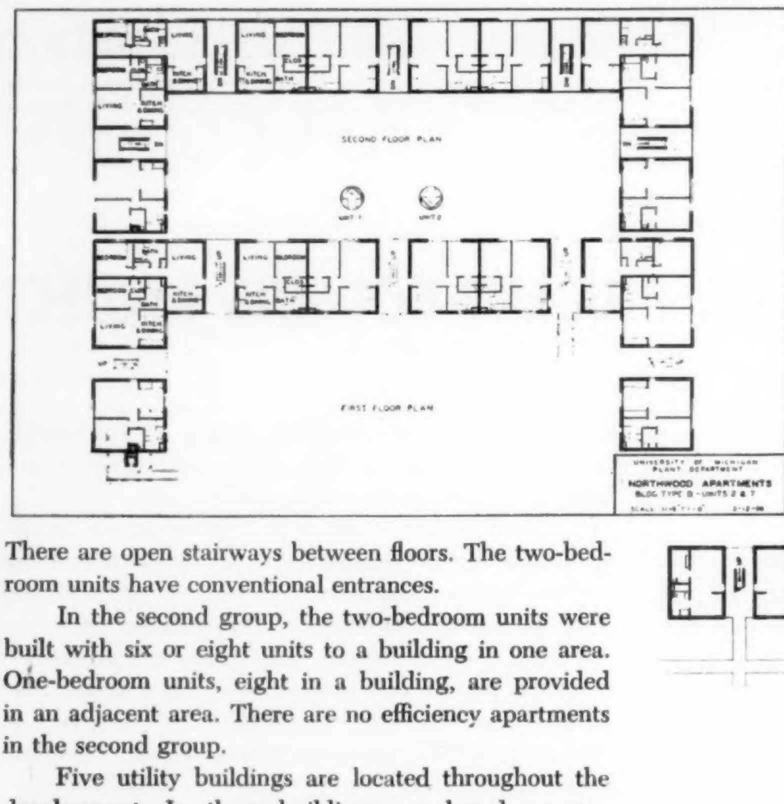
The project was built in two stages. Group one, of 100 units, was completed in 1955 and group two, of 296 units, in 1957. Yamasaki, Leinweber and Associates were the architects.

All the apartment buildings are two story without basements, and are of frame construction with brick veneer. Throughout the development efficiency and one-bedroom units are on one floor level, and the two-bedroom apartments are on two levels with the sleeping quarters and the bathroom located on the second floor.

Buildings Included in the Project

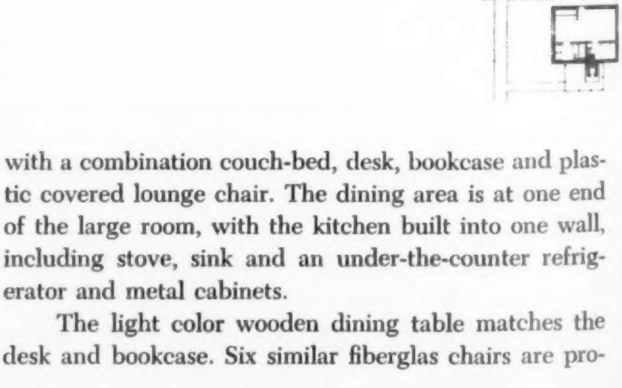
In the first group constructed, the efficiency and one-bedroom apartments open onto bilevel breezeways. Two apartments on each floor share a covered opening.

Northwood group one apartments consist of 100 units. The group was completed in 1955. Yamasaki, Leinweber and Associates are the architects for the whole development.



Building type B, at left, consists of units with a living room, combination kitchen and dining area, one bedroom and bath.

Building type A, shown below, is an L-shaped structure, but the interior one-bedroom apartments are similar to type B. Altogether there are 256 one-bedroom apartments in the development.



There are open stairways between floors. The two-bedroom units have conventional entrances.

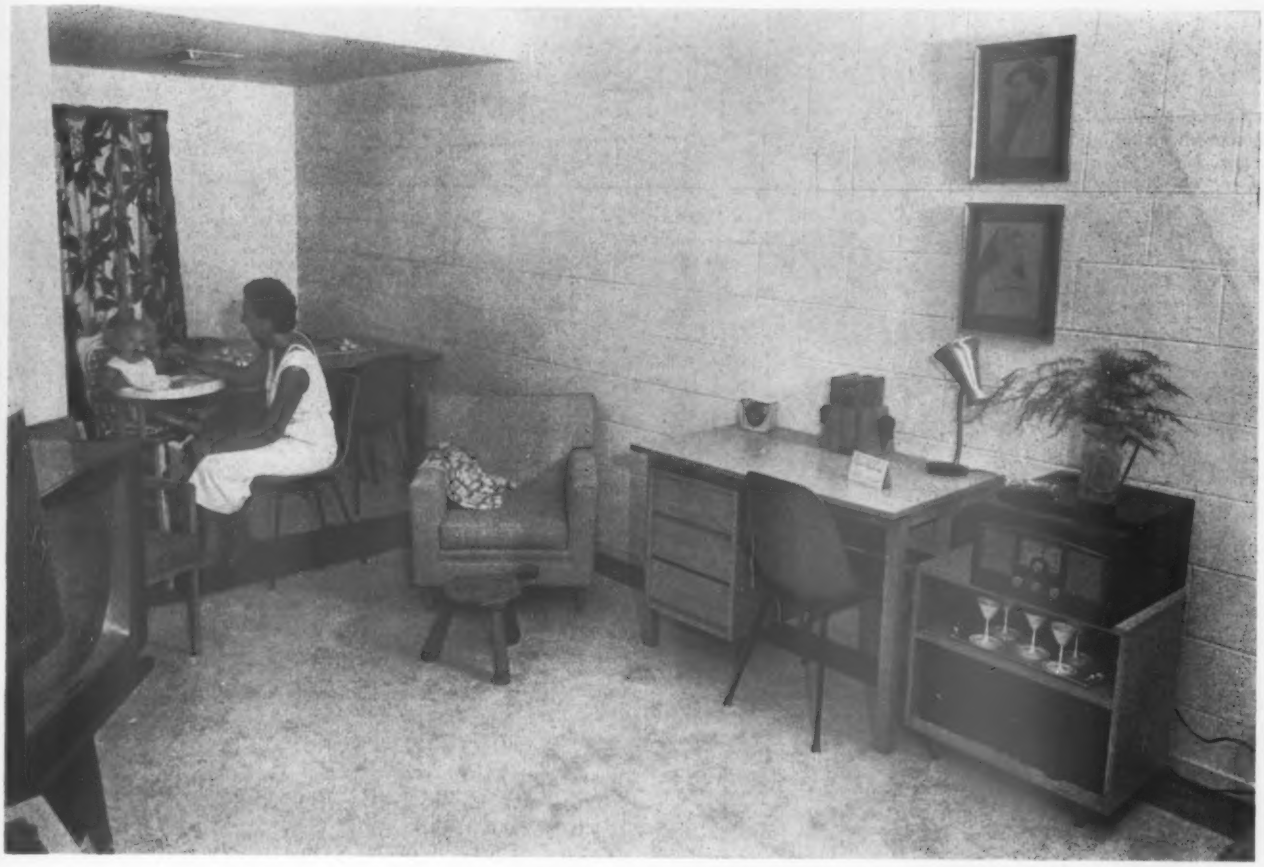
In the second group, the two-bedroom units were built with six or eight units to a building in one area. One-bedroom units, eight in a building, are provided in an adjacent area. There are no efficiency apartments in the second group.

Five utility buildings are located throughout the development. In these buildings are laundry rooms equipped with coin-operated automatic washing machines and dryers. Individual storage cribs for each tenant are located in the basements. Two of the buildings house boiler rooms which are the source of hot water heating for all the apartment buildings. One utility building has the manager's office and the post office, providing individual mail boxes for each apartment.

Compact Efficiency Apartment

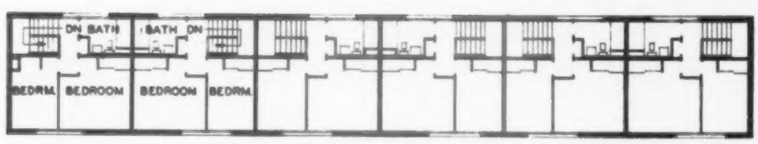
An efficiency apartment consists of a large living room with picture windows at either end. It is furnished with a combination couch-bed, desk, bookcase and plastic covered lounge chair. The dining area is at one end of the large room, with the kitchen built into one wall, including stove, sink and an under-the-counter refrigerator and metal cabinets.

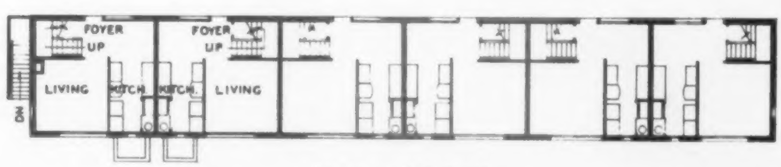
The light color wooden dining table matches the desk and bookcase. Six similar fiberglas chairs are pro-



University of Michigan News Service

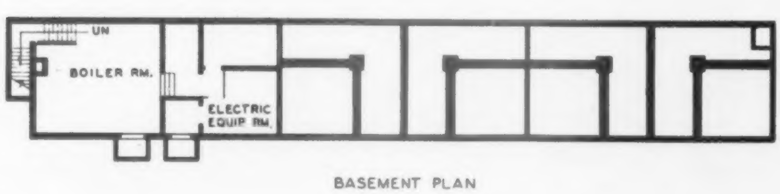
The two-bedroom units of Northwood group two have a combination living room-dining area. There are six or eight of these units in a building.





FIRST FLOOR PLAN

Basement of building type C, at right, has the boiler and electrical equipment rooms. Living room, dining area and kitchen are on one floor, with two bedrooms and bath reached by stairway.



BASEMENT PLAN

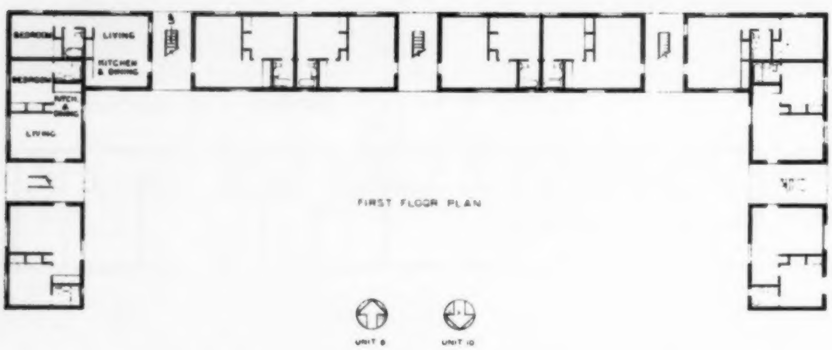
vided for use at the table, singly at the desk or as side chairs.

Behind the kitchen area is the bathroom, and next to it is a large walk-in closet with extra storage space. A roll-away bed can be conveniently stored in the closet. On the back of the closet door is a full length mirror.

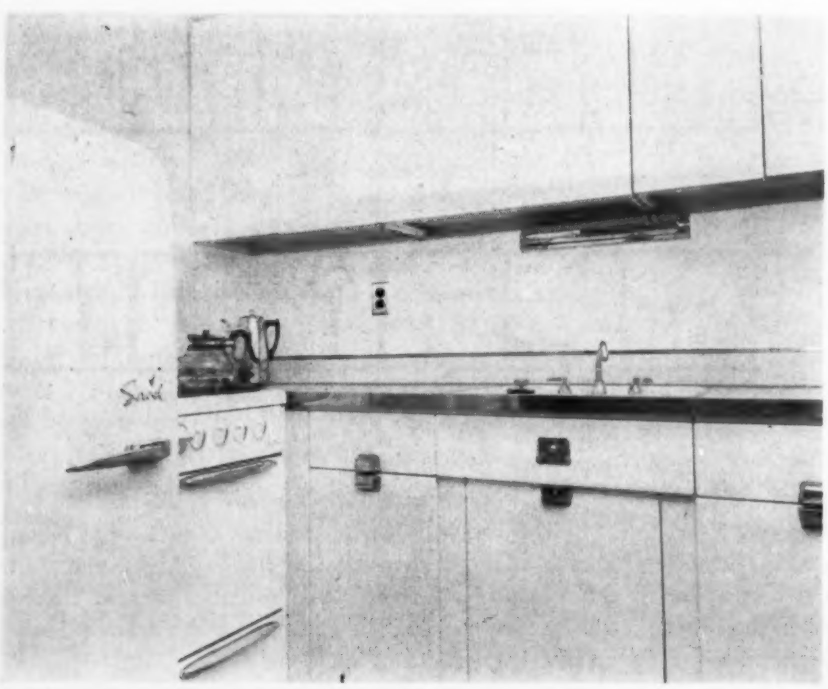
One and Two-Bedroom Units

The one-bedroom apartments have a large living-dining room, with a kitchen built-in along one wall. Most units have a slat-wood sliding screen to conceal the kitchen section. The bathroom and a spacious walk-in closet open off the bedroom.

Kitchen area in the one-bedroom units is centralized on one wall of the apartment. A slatted screen can be drawn to conceal the kitchen area.

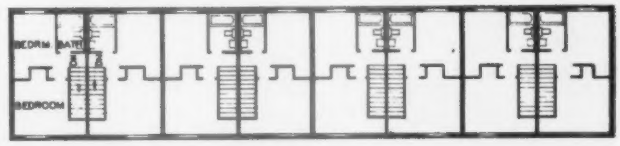


Building type D of the Northwood Apartments is a U-shaped structure. Apartments have one bedroom, bath, living room and kitchen and dining areas.

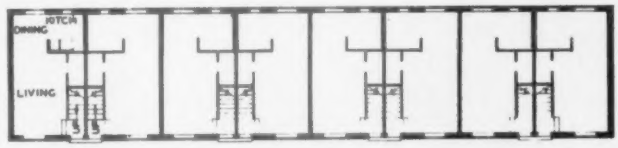


Kitchens in the two-bedroom units are in an ell adjacent to the dining area. Separate stoves and refrigerators are furnished. The sink is a built-in cabinet style, and there are spacious wall cabinets above.

A large walk-in closet with a slatted screen door, and the bathroom open off the bedroom of the one-bedroom apartments.



SECOND FLOOR PLAN



FIRST FLOOR PLAN

The apartments in building type E have two bedrooms and bath on the upper level and living room, dining room and kitchen on the lower level.

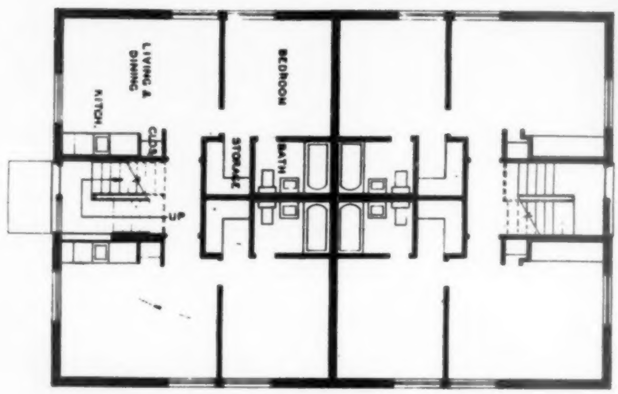
The two-bedroom units have living-dining rooms that are longer than those of the other apartments. Kitchens in these units are in an ell adjacent to the dining area. Separate stoves and refrigerators are furnished. Closed stairways, just inside the entry, lead to the bedrooms and bathrooms on the second floor.

Furnishings in the one and two-bedroom apartments are similar to those in the efficiency units, including the combination couch-bed. An additional occasional chair, plastic covered, is provided. In the bedroom is a modern style suite, consisting of a double chest of drawers, a night table and the bed. A large mirror is permanently hung on one wall in the two-bedroom units. The second bedroom is not furnished. This is generally a children's room and tenants supply their own youth beds, cribs, etc.

Dining area, foreground, is at one end of living room in the two-bedroom apartment.

Rentals in the Northwood Apartments at the University of Michigan are $80, $90 and $105 per month respectively. Group two, with 296 units, was constructed in 1957. Five utility buildings are located throughout the development.

Building type G, below, consists of apartments with a bedroom, bath, large storage area, living-dining room, kitchen and a closet off the living room.



All units have aluminum sliding windows and screens. Above each window is a built-in drapery rod with small sliding rings. Kitchen sinks have garbage disposal units. Trash is burned in incinerators at each utility building. Exhaust fans are installed in the walls of kitchens and bathrooms. Most apartments have access to a central television antenna for the entire development.

Floors throughout are of asphalt tile. Plastic tile is used on walls in the bathrooms. In group one buildings, the walls are plaster, and in group two there is dry wall construction. All walls are painted white. Hand fire extinguishers are easily accessible to each apartment.

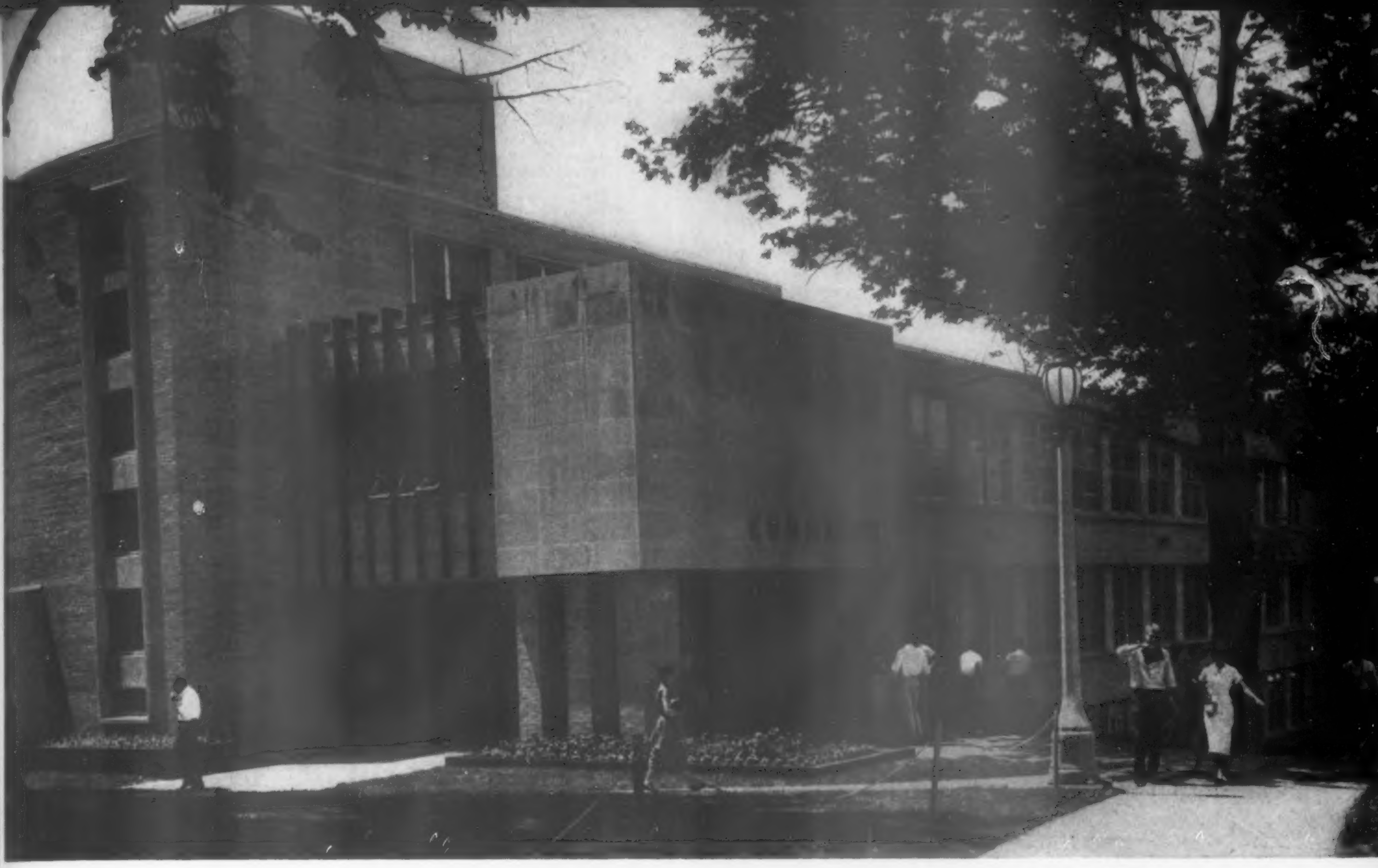
The Travel Situation

Serving the Northwood area is a simple road network branching from the main streets which run through North Campus. There are nine parking lots located in various parts of the development. The whole area is within reach of a state highway leading directly into Ann Arbor, about two and one-half miles away. The highway east is a through route to Detroit.

Financing of the Northwood Apartments is on a self-liquidating basis. Funds borrowed to pay for the buildings will be repaid from rental revenue. The total cost of the first group was $1,100,000 which includes construction, land improvements, architectural and engineering fees, financing costs, and furnishings. The cost of group two amounted to $3,300,000.

Plans for a Third Section

Construction of a third section of the Northwood Apartments will be started in the fall of 1957. There will be 288 units, similar to those in groups one and two. Accommodations will include 144 two-bedroom, and 144 one-bedroom apartments. Experience has shown that there are enough efficiency units now available, and that the greatest demand is for one and two-bedroom units.



The U-shaped Commerce Building's main entrance is at the northeast corner of the first floor, where the 4 story center section joins the 3 story wing. The architects are Law, Law, Potter and Nystrom of Madison.

FIVE-LEVEL COMMERCE BUILDING— SOLUTION TO A SLOPING SITE

by DAVID GORDON

Research Assistant, University of Wisconsin News Service, Madison

David Gordon received his B.A. from Carleton College, Northfield, Minnesota, and is currently working toward an M.A. in political science at the University of Wisconsin. During 1957-58 he attended the Graduate School of Journalism at Columbia University. At Carleton he served as sports news director during his senior year.

CULMINATING more than half a century of constant development in teaching, research, and service in the field of business, the University of Wisconsin School of Commerce moved into its own building for the first time in February, 1956, when classes began in the one and one half million dollar structure.

Dedicated the following May, two years after ground-breaking ceremonies, the Commerce Building provides a functional and attractive setting for commerce classrooms, faculty offices, and administrative units, all of which had previously been scattered from one end of the campus to the other.

Originally housed in North Hall, one of the first two buildings erected on the Wisconsin campus, the commerce department made its headquarters on the fourth floor of Sterling Hall from 1917 until 1956. At the peak of the post-war enrollment, commerce students attended classes in 29 different buildings. Just before the opening of the new structure, classes were still found in 20 buildings scattered over a wide campus area.

At present the enrollment in the School of Commerce totals nearly a thousand juniors, seniors and graduate students, with some 500 additional students entered in second-year pre-commerce courses. Besides these students, many from other departments are served by the new building.

Conceived as the first unit in a social studies building group, the fireproof, reinforced concrete structure is built in the shape of a U, with an additional wing to close in the quadrangle planned for the future. All three sections of the U, and especially the auditorium, are

used for many classes and meetings other than Commerce School activities.

Site Was a Challenge

The challenge of a sloping site was met by the Madison architectural firm of Law, Law, Potter and Nystrom, with a five level structure built into the hillside west of Bascom Hall, the central building on the Wisconsin campus. Through the use of matching color and materials, the exterior design was harmonized with the stonework of Bascom Hall and the brick of Sterling Hall, which stands to the south and down the hill.

The building contains 16 classrooms, three large lecture halls and an auditorium, nine statistics and accounting laboratories, and six seminar and conference rooms. In addition it houses, under one roof, the administrative offices of the School of Commerce, faculty offices, a library, three faculty and student study rooms and lounges, the offices of the Bureau of Business Research, and the university's Reserve Officers Training Corps office.

Figures and Facts

The structure, budgeted at $1,750,000 by the State Building Commission, cost a total of $1,464,715 including an expenditure of $135,824 for equipment. Excluding the latter expense, the building cost $15 per square foot of floor space (it contains a total of 88,628 square feet) and $1.23 per cubic foot (the total is 1,083,736 cubic feet). Of the total cost, $908,079 went to the general contractors, J. H. Findorff and Sons, Madison. The remainder went for electrical and plumbing contracts, heating and ventilating, an elevator, architectural and engineering fees (totaling $90,450) and miscellaneous shop orders.

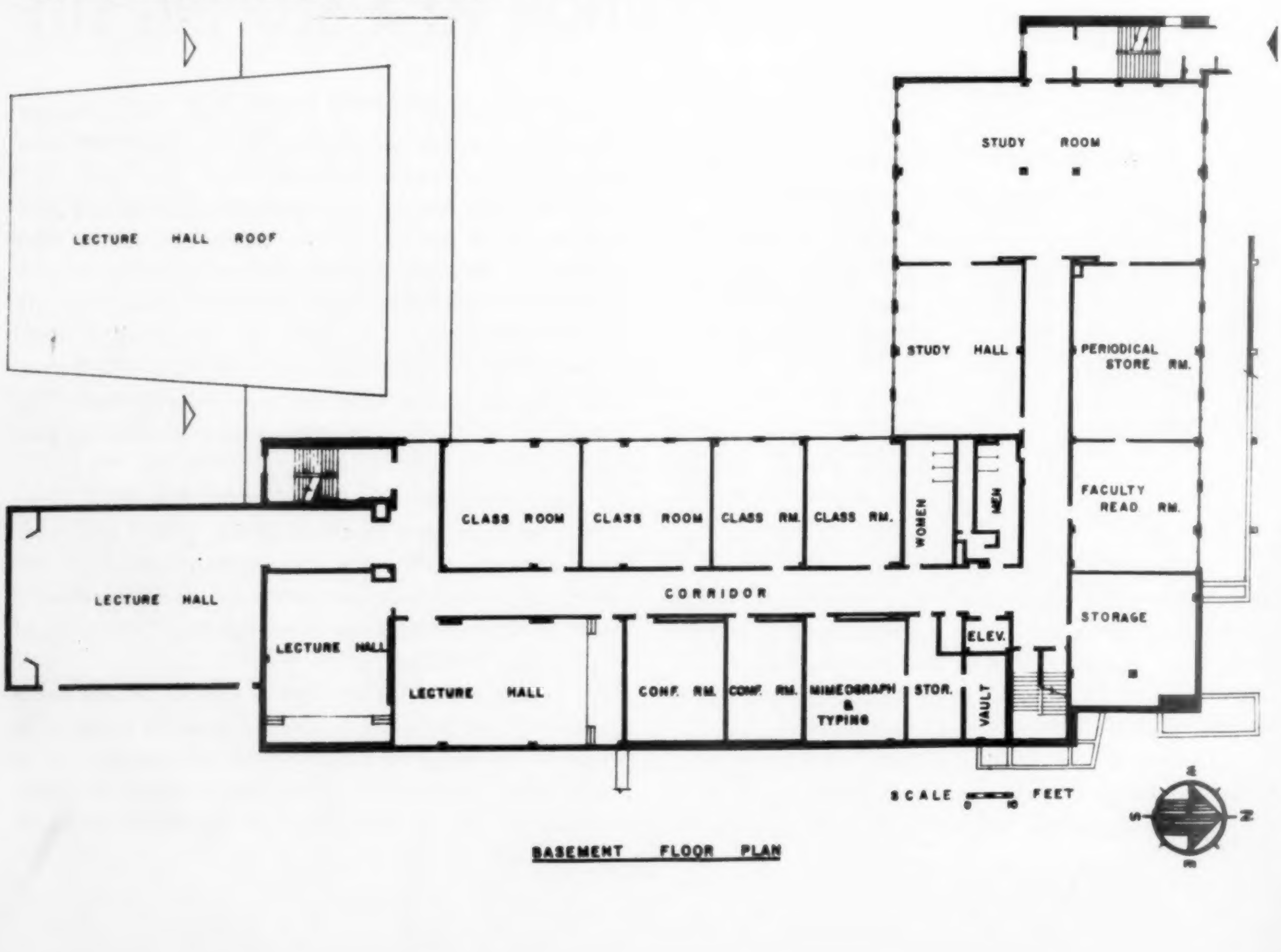
A committee, composed of four Commerce School faculty members plus the secretary of the Wisconsin faculty and the UW director of physical plant planning, selected the site and conferred on the needs which the new structure should fulfill. After correspondence with other schools to discover the strong and weak features of their new buildings, the committee worked with the architects on the plans.

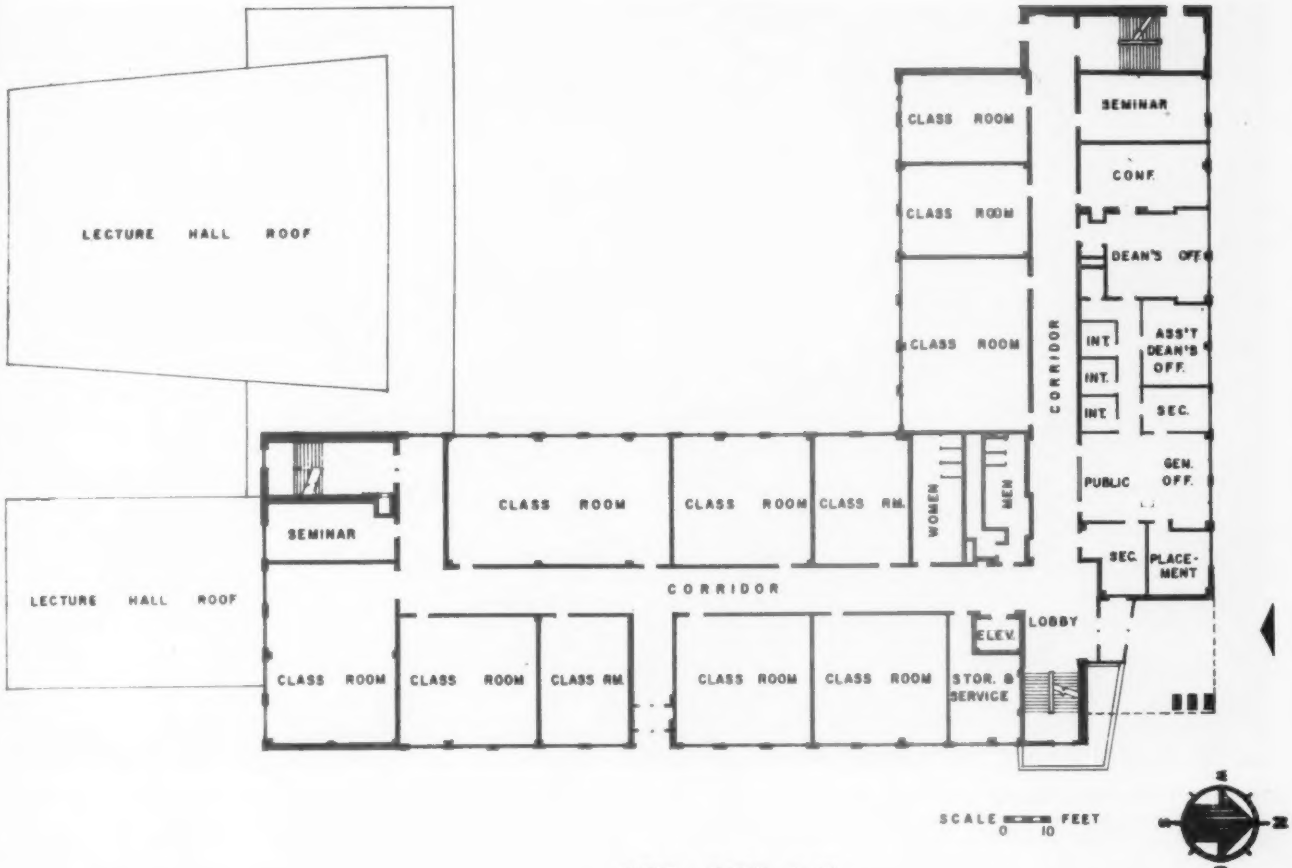
A Building With Innovations

Built to balance laboratory space in other recently constructed university buildings with additional classrooms, the Commerce Building contains several innovations. Most radical departure from past practice in academic building design is not the sloping site but the grouping of faculty offices on one floor, a feature which economizes on both space and traffic flow.

In the past, offices and classrooms have been interspersed, with the inevitable result that one or the other

Only the east side of the basement floor lacks windows. At this level are three lecture halls, classrooms, conference rooms, storage spaces, faculty reading, study hall, study room and a periodical store room.





FIRST FLOOR PLAN

Administrative offices of the Commerce School are housed in the northwest wing of the building at the first floor level. Classrooms, seminar rooms and storage spaces are also located on this floor. The three sections of the building's U-shape are connected, and the auditorium unit, two levels below the first floor, is separately accessible.

An outstanding feature of the new building is the grouping of faculty offices on the third floor, together with a secretarial pool and faculty-service facilities. The faculty offices, 11' by 13', are located on the outer side of the two corridors which traverse the third floor, with the secretarial office and faculty-service rooms located between the corridors.

The three lecture halls, located on the ground floor (basement) of the building are constructed similarly to the 550-seat auditorium, located in the sub-basement. All are built with sloping floors and have public address systems, visual aid equipment and theater-type seats with large collapsible writing panels for convenient use by either right or left-handed students. Ventilation is controlled.

is either too long or too narrow. In the Wisconsin building, the entire third floor is devoted to faculty offices and faculty-service facilities. It contains a secretarial pool, a small faculty lounge with kitchenette, the offices of the Bureau of Business Research, and three larger offices for use by teaching assistants in addition to 31 single offices, 11′ by 13′, for the commerce faculty.

This arrangement is a change from the design of most science buildings, where it is most efficient to locate faculty offices next to the laboratories. It allows economical planning and design, confines heavy traffic to the lower floors, saves stair climbing for students attending classes, provides the privacy required for study and for student-faculty conferences, and saves on stenographic help with a common pool for the use of all faculty members.

According to Dean Erwin A. Gaumnitz, who served as chairman of the faculty planning committee, the arrangement has worked well in practice. Limiting the classrooms to the more accessible floors has helped to localize congestion between classes and speed the flow of traffic in and out of the building.

Structure Has Three Units

The slope of the building's site not only provides entrances on three levels, thus aiding traffic movement, but also allows parts of both the basement and sub-basement to be used for academic purposes. The structure at present contains three units: a four-story center section, 60′ by 150′, a three-story wing to the northwest, and the auditorium wing to the southwest. The latter unit, two levels below the main floor, has two entrances on the south side, which allow it to be used by many campus groups without disturbing other activities of the Commerce Building.

Three other entrances—the main one in the northeast corner of the structure on the main floor; the eastern entrance, also on the first floor level but opening onto the terrace at the rear of Bascom Hall; and a basement level entrance on the northwest corner leading directly to the library, reading room, and student lounge one level below the main floor—establish easy access to the building.

Exterior and Interior Features

The exterior of the solid slab building is of buff face brick and Indiana limestone trim with black granite accents at the entrances. Large, almost continuous, double-hung aluminum windows provide natural light for at least one wall of every classroom. Ceilings in all rooms are mineral fiber acoustical tile cemented to the underside of the solid concrete slab, with the exposed concrete beams painted to match the tile. Most of the interior walls are concrete block painted in light pastel colors. One wall of most classrooms is painted a different color for contrast. Corridor floors are glazed structural facing tile, individually colored on each level.

The 550-seat auditorium, designed for operation

On the second floor there are nine statistical and accounting laboratories. Walls are covered with acoustical tile to reduce the noise level. As in all class and lecture rooms, a double coathook strip and a shelf for books are included to avoid having students pile their belongings on classroom chairs.

Hub of the administration offices is the public reception room, which is separated from the secretaries' offices by a waist-high counter. In the background is the office of the dean's secretary. Opening directly off the reception room are the registrar's office, the offices of the director of placement, the dean and the assistant dean, and three acoustically treated interview rooms.

as a self-contained unit in the sub-basement, is accessible from the outside as well as from the rest of the building. Since completion, it has been in constant demand for afternoon and evening events by such university groups as the Film Society and the Music Clinic. In addition, it is used for departmental lectures. Dual control wiring permits the operation of projectors from either the back or the front of the room, and will be used for future TV broadcasts, if the occasion arises.

Under the south end of the center section a partial sub-basement (used for storage) exists on the same level as the auditorium, with a pipe tunnel leading from it under the center of the building. Beneath the library, located in the northwest wing, a storage room which also contains the structure's electrical panels forms another sub-basement.

The slope of the site permits four classrooms (containing 36–71 seats each) on the west side of the basement (or ground floor) in the center section to utilize natural light. This level of the center section also contains two conference rooms, providing 20 seats apiece around U-shaped tables, plus a typing and mimeograph room, an office for the university ROTC units, and a small vault for storage purposes.

Also on this lower level are three large lecture rooms easily reached from any of three entrances. They are suitable for and available to other university departments when not used by commerce classes. These lecture rooms (seating 220, 150, and 120), like the auditorium, have rubber tile aisles and sloping concrete floors designed to increase visibility. All have theater-type seats with large collapsible writing panels for use by either left or right-handed students, a public address system, vertical sliding chalkboards, complete blackout for visual aids, built-in mechanically operated projection screens, and a movie and slide projection cabinet. As in

the auditorium, the projectors can be controlled from a stage in the front of the room.

144-Seat Study Hall

The ground level of the northwest wing, which receives natural light on both sides, contains the 144-seat study hall with an adjacent stack room housing a periodical file of trade journals and other publications devoted to business activities. Also on this level of the wing are a 20-seat faculty reading room, a large storage room, and a 24-seat student lounge and study room which has seen near-constant use, according to Dean Gaumnitz.

The main entrance to the building, located in the northeast corner of the first floor, provides a large, protected area for students during inclement weather. The floor is of gray granite and there are large black granite planting areas on two sides, while three brick pillars close in the area on the northeast corner.

Just inside the main entrance, the lobby has one wall of face brick extending from the outside through the main entrance, and one wall 12′ by 10′, of black and gold marble, harmonizing in color with the exterior buff brick and black granite. It has a rust color quarry tile floor and an acoustical tile ceiling.

In the lobby itself are display cases and a building directory and, to the right, on the wall opposite the administrative offices, are 64 individual combination lock letter boxes for the faculty, a large display case, a large cork bulletin board, and a recessed public telephone.

The remainder of the first floor contains class and seminar rooms and the school administrative offices. The latter spaces include the public reception room and secretarial office, offices for the dean, associate dean and the dean's secretary, the registrar's office, a placement office, three employment interview rooms, and the dean's conference room. The last-named room, adjacent to the dean's office, contains 25 seats and is walnut-paneled to match the decor in the offices of the dean and associate dean. The interview rooms, eight feet square and acoustically treated, are used for undergraduate and graduate employment interviews, which this year hit a record peak both for companies represented and interviews conducted.

Second and Third Floor Facilities

The second floor, duplicating the two below it in occupying both the center section and the northwest wing, contains one seminar room, one 40-seat classroom, and nine statistical and accounting laboratories. Designed to be used interchangeably as classrooms, the laboratories are used for two and three hour classes, and are located above the first floor to help limit traffic congestion between classes to the lower floors. Three accounting labs provide 78 seats apiece, while one contains 106 seats. All five statistical laboratories contain 31 seats each.

The third floor, occupying only the central section

Adjacent to the dean's office is a conference room which is paneled to match the decor of the dean's office. Both of these rooms are located in the administrative unit on the first floor.

Two original ceramic tile mosaic murals decorate the opposite ends of the auditorium corridor. Executed by Professor James S. Watrous of the University of Wisconsin department of Art History, the 12′ by 8′ pieces symbolize ancient (above) and modern trade.

of the building, is divided into two corridors with faculty offices along the outside walls of the building and the faculty-service and teaching assistants' rooms between the corridors. At the north end of the floor, the Bureau of Business Research has four single offices, a secretary's office, and a small soundproof room for calculating machines. The elevator provided in the building, of the key type, is for the exclusive use of personnel on the third floor.

Each floor contains a custodian's room and adequate storage space as well as men's and women's rest rooms. Ease of maintenance is the keynote throughout the building. Corridor floors and stairs are terrazzo, washroom floors are ceramic tile, and all other floors are asphalt tile. Toilet partitions and window sills are marble, and all stair rails are aluminum. The corridors, stairways and rest rooms have walls of stack bond, glazed structural facing tile.

The auditorium, large lecture rooms, and corridors have suspended tile ceilings. All of the statistical and accounting laboratories on the second floor have perforated metal pan acoustical tile walls reaching from 3′1″ above floor level to the ceiling, thus reducing the noise level from the many machines used.

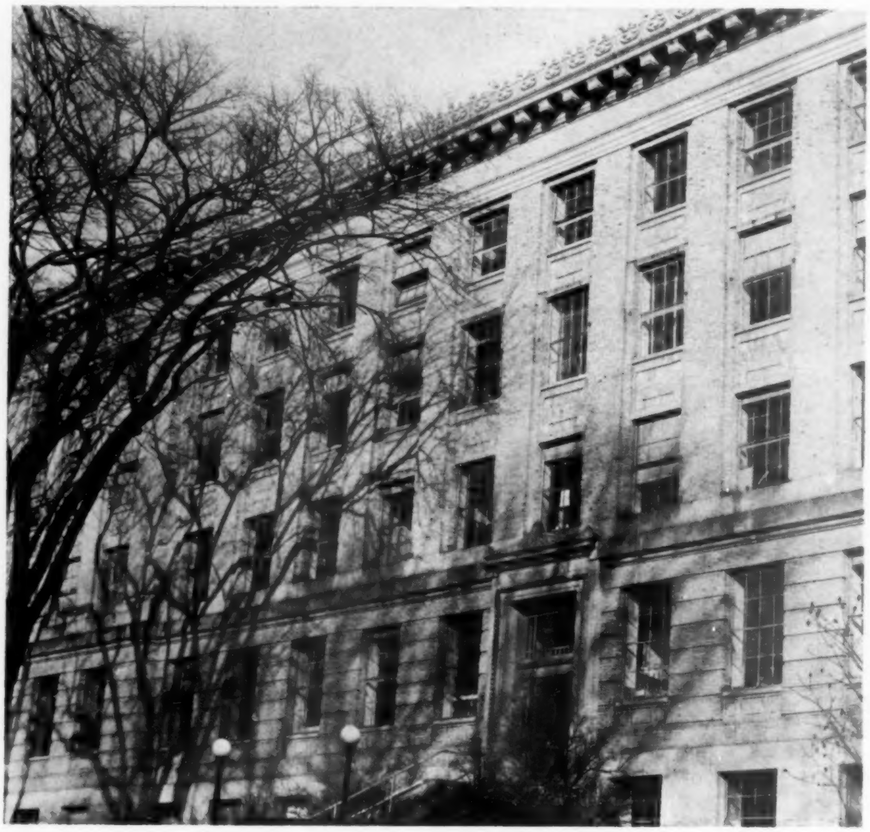
Classroom Conveniences

The classrooms contain a 6′ by 8′ platform, 8 inches high, for the instructor and his desk. A double coathook strip and a shelf for students' equipment, found in each class and lecture room, are convenient and, in addition, prevent students from piling coats on empty seats, reducing the intended capacity of the rooms. The small classrooms, often used for language and mathematics instruction, have chalkboards on three sides to enable class members to do simultaneous work at the boards.

A central university heating plant provides steam for the low pressure vacuum-return heating system in the building. The steam tunnel, dug anew after discovery that the original one ran under the site of the building, runs along the side of the structure. The entire building is mechanically ventilated, with individual

rooms heated by a system of convectors and unit ventilators. The latter circulate fresh air during the hot months, although the auditorium and lecture rooms have individually controlled mechanical ventilation.

Fluorescent lighting fixtures are used in the academic rooms, with recessed fixtures in corridors and lecture rooms. Special strip lighting was provided over the chalkboards in the lecture rooms. The building contains complete raceways for a future radio intercommunication and public address system, a television system and visual education outlets.



Sterling Hall, which stands down the hill from the new Commerce Building, was the headquarters for the commerce department from 1917 to 1956, when classes began in the new structure. Commerce offices were located on the fourth floor of Sterling Hall, but classes were held in over 20 buildings scattered throughout the campus.

Mosaic Murals in Lobby

Of special interest are two original mosaic murals on the lobby walls at either end of the corridor in front of the auditorium. The 12′ by 8′ pieces, symbolizing ancient trade and modern commerce, were executed by Professor James S. Watrous, chairman of the department of art history. He constructed the spectacularly colored murals with thousands of small pieces of Venetian glass, utilizing some 25 colors, but featuring strong blues and rich reds against a gold background.

The mosaics were made possible through the Howard L. Smith bequest, which finances benefits in the humanities from a $170,000 trust willed to the University by former Law Professor Smith, to be used "in the promotion of liberal culture . . . especially in the field of poetical and imaginative literature, art and philosophy." Dean Gaumnitz has pointed out that many individuals are able to enjoy the murals, first of their kind used in buildings on the University of Wisconsin campus, because the auditorium, like many parts of the Commerce Building, is used by many campus organizations.

Florence Wing Library at Wisconsin State College, LaCrosse, Wisconsin, was designed by architects Foeller, Schober, Berners, Safford and Jahn of Green Bay.

FLORENCE WING LIBRARY, WISCONSIN STATE COLLEGE

by MARY H. HEBBERD

Associate Professor, Director of Public Relations, Wisconsin State College, LaCrosse

Mary Hardgrove Hebberd holds B.S. and M.A. degrees from Ohio State University, with further study there also. She is director of public relations at Wisconsin State College, as well as teaching communications. Articles by Mrs. Hebberd have appeared in various magazines, including *Nation's Schools* and *Elementary School Principal*.

FLORENCE Wing Library at the Wisconsin State College, LaCrosse, was designed to serve the needs of a growing student body, with the basic philosophy of bringing books and readers together. The building, begun in 1955, was fully occupied in February, 1957. The architects were Foeller, Schober, Berners, Safford and Jahn of Green Bay.

Planning the building was a cooperative project during which the library staff, other faculty members, the administration and representatives of the architectural firm drew up a list of functions and purposes for which the building was to be used. They then proceeded with more specific plans to fill those needs. During the planning stage, committee members visited other college and university libraries of recent construction to see, at first hand, what others considered essential and desirable.

The result is a building planned to be inviting, easy of access, friendly and comfortable in arrangement, and utilitarian in meeting the needs of the users.

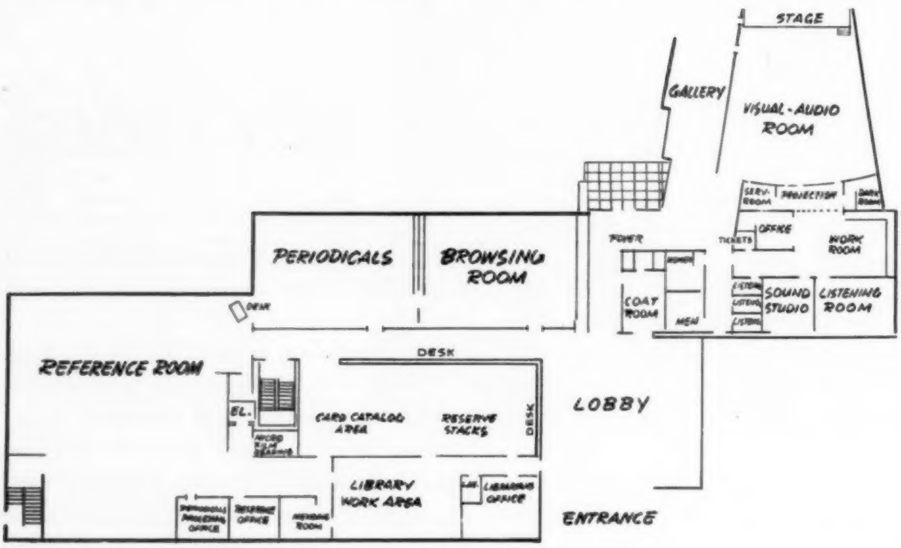
The exterior is faced red brick to blend with the other campus buildings, and has Indiana limestone trim. The two-story, English basement structure was completed at a cost of $814,000 for the building and $79,602 for equipment. In addition to the library proper, a curriculum laboratory, an audio-visual center, a college textbook library, seminars, lounges, a conference room and archives are housed in the 58,100 square feet of floor space.

Lobby Is the Nerve Center

The main entrance on the south gives access either to the lobby and the controlled library or to stairways leading to the other floors. The lobby is the nerve center of the building. From it, the visitor may use the reserve or main charging desk, the card catalog, go on to the browsing, periodical and reference rooms, or to the other floors within the building.

The browsing room on the north is a pleasant, quiet room in which the librarians place new accessions, weekly news magazines and other materials for recreational reading. This room was planned as a sort of show

LaCrosse Tribune Photos



First floor houses the reference room, periodicals, browsing, visual-audio, listening and work rooms. Card catalog area and reserve stacks are also located at this level. The building has two stories and the exterior, see above, is faced with red brick with Indiana limestone trim.

place for the students with its furnishings of outstanding examples of modern design.

Periodical and Reference Rooms

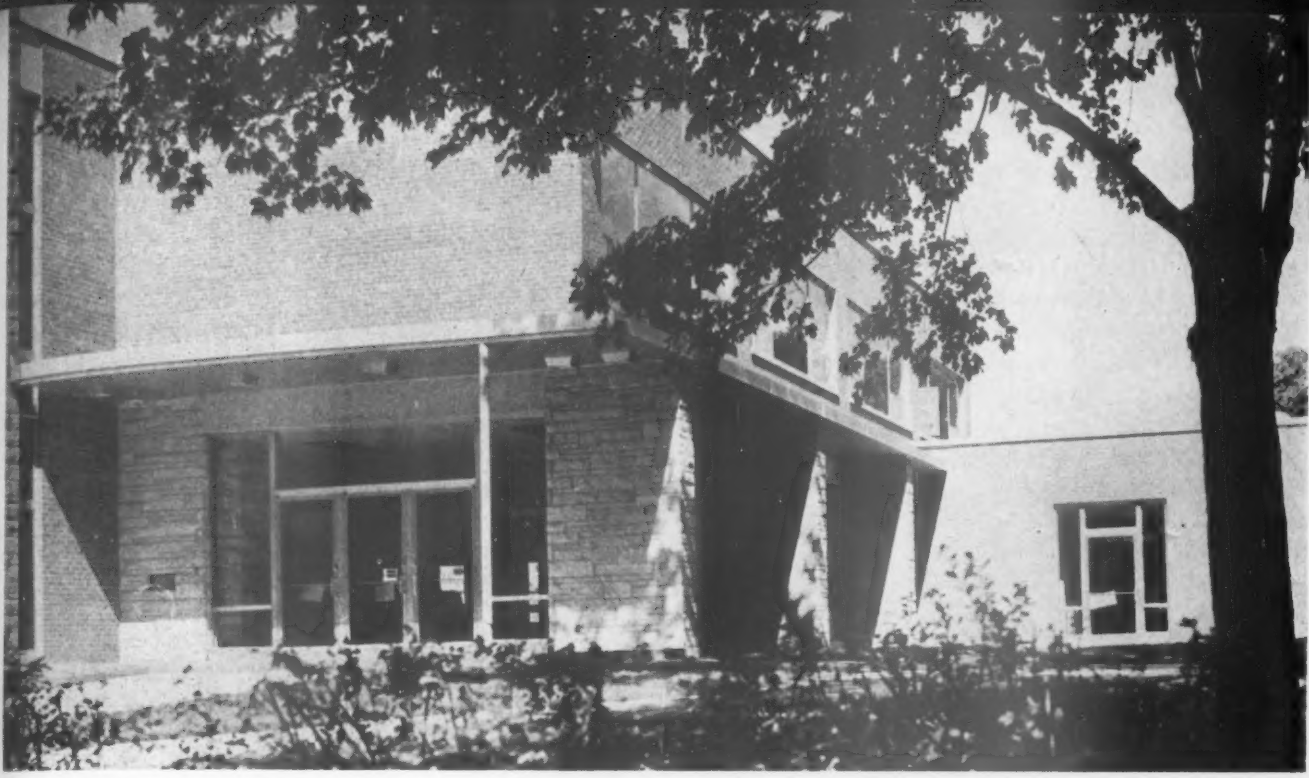
The periodical room not only has individual and group seating at tables but lounge furniture for those who prefer reading their magazines in greater comfort. Magazines are available not only on slanting wall shelves but also from islands of the same natural white oak.

The reference room's free standing stacks hold the reference materials and bound magazines. Encyclopedias are placed on especially designed tables, and the student finds map cases, pamphlet and picture files also in this room. Here again the furniture provides for solitary or group seating. A room for the reading of microfilm is located near the staff elevator. A sweeping view of most of the first floor of the library is available from the main and reference desks.

The offices and work areas for library administration are on the south side of the building, close to the circulation and reserve desk, the card catalog and the elevator. Here books and other library materials are ordered, processed and even repaired.

Second Floor Areas

The library's main collection is found on the second floor which is reached via a stairway near the center of the building. Here the user finds a fully equipped library science classroom with adequate work space and well designed furniture. Along two interior walls are rows of carrels with individual grilled lockers where students may leave research materials. On the north are single and group tables with still others at advantageous



Reference room, at right, has free-standing natural white oak stacks. Furniture is of the same wood with formica table tops. The lighting is troffered, recessed. Encyclopedia tables are at the left.

points close to the stacks. Groups of lounge chairs on this floor encourage students to seek this area. The three doors located along the second floor corridor are available only in case of emergency.

In the uncontrolled area on the second floor are four seminars, a conference room which will seat thirty, a staff lounge with pullman kitchen, and some offices.

On the lowest level, the controlled curriculum laboratory is reached by the mid-library stairway. The seminars, textbook library, archives, offices, faculty lounge, women's lounge and storage rooms are reached via the main stairway.

Audio-Visual Center

As a wing to the library, the audio-visual center which occupies 7,100 square feet gives the student additional resources beyond the traditional printed collections. The center includes a laboratory, a large listening room, three individual listening rooms, a photographic dark room, a projection booth and a 200-seat lecture room.

Heart of the Center

Heart of the center is the workroom from which all other rooms radiate. Built-in cupboards and work space line two walls. Glass walls help to give a feeling of spaciousness as well as a view of what is going on.

The small listening rooms are available for students or faculty using language records, reading accelerator, or even for previewing films or slides when other space is in use. The large listening room, furnished with lounge furniture and seating fifteen, can be used for music groups or even previewing. It is equipped with a three way speaker.

A valuable addition to the campus is the 200-seat lecture room for films, lectures, demonstrations, discussions, small musical groups and, at least once a week during the academic year, recorded jazz concerts. Seven sound outlets have been built into the ceiling and two into the platform wall.

The auditorium's rear wall has baffled oak paneling for nearly perfect acoustics. Lighting in the room is controlled from either the stage or the projection booth. Students find that lighting which can be dimmed for viewing yet sufficient for notetaking is a great advantage.

Equipment in the lecture room includes a motorized screen which can be raised or lowered from either the stage or projection booth and an overhead projector. The small stage can be reached via a few steps at the right side of the auditorium or a door at the left. Storage space is built into the passage to the stage.

The Sound Studio

The sound studio, when completely equipped, will have turn-tables, and other devices by which sound can be sent into other areas, according to needs. Equipment will include a console cabinet containing a high fidelity booster, four microphone pre-amplifiers, a speaker selector panel and other desirable equipment.

A ticket office is available from the corridor when needed. The corridor itself affords ample display space.

The audio-visual center has been designed so that it can be open when other areas of the library are closed, and the library itself may be open at times when the audio-visual center is closed.

There is a luminous ceiling above the main charging desk. Desk and paneling are oak.

Structural Details

Lighting in the library is troffered recessed fluorescent in all public areas. A special feature is the large

The audio-visual center of the Florence Wing Library has a lecture room which seats 200. The room features controlled lighting, speakers in the ceiling and rear wall of the platform, and a motorized screen.

Browsing room of the library has curtained windows, and a blending of modern furniture—plastic and molded plywood chairs, benches, metal and formica tables and upholstered pieces.

luminous ceiling in the main lobby which gives even, shadowless light at all times.

Ceilings throughout are acoustically treated, most being of metal acoustical tile suspended from structural slabs. All duct work for air circulation is above the finished ceiling.

Windows and most of the doors are aluminum framed. Hollow metal doors are used for service entrances. Granite platforms serve at all entrances and marble for all window sills.

Flooring in the entrances and stairways is mosaic tile. In the lobby and other areas of general use, vinyl tile is used and in all others, asphalt tile. Inside walls are painted or vinyl plastic covered plaster, glass, oak paneling or red brick.

Hot water heating comes from a central plant and is distributed through wall fin convectors. A pneumatic-operated modulating system controls steam valves, hot water valves, fresh air and recirculating air dampers. This is assisted by an outdoor weatherstat and a sensitive pressurestat inside the building. Provision is made for a change of air in all public areas six times each hour.

Colors and Coverings

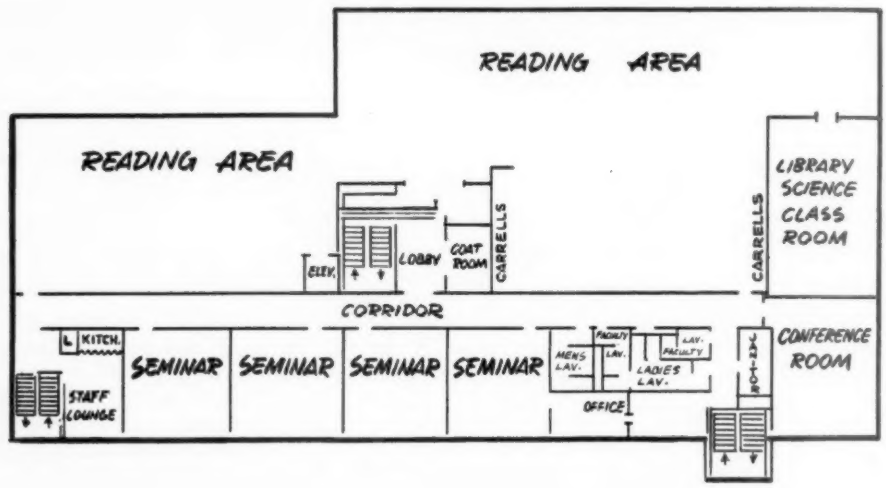
Wall colors and furniture coverings have added to the beauty of the library while accenting its simplicity of design. Naugahyde is used on all lounge furniture except that in the browsing room. There a linen-like durable fabric covers the foam rubber upholstery. Formica is used for most table tops and natural oak for all chairs and tables.

Special features which have drawn student comment are the eye-rest green chalkboards, the glass and

In the browsing room students find a quiet, pleasant room for recreational reading in a restful atmosphere.

LaCrosse Tribune Photos

The periodical room has both shelf and island space for magazines. There are individual and group tables and lounge furniture for the students.



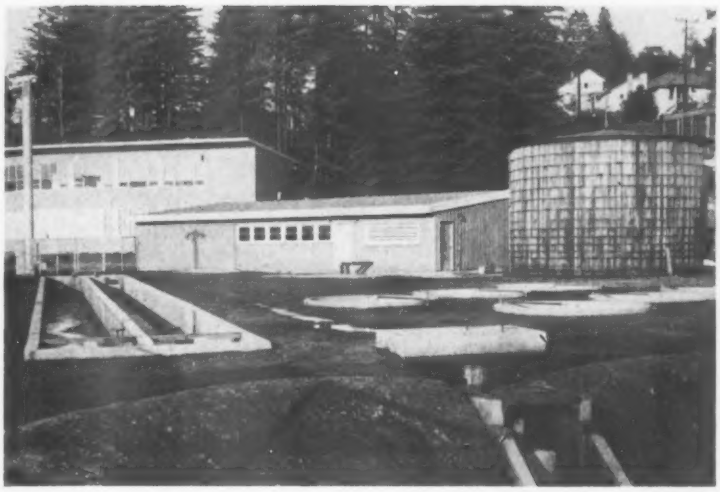
The second floor of the library has two large reading areas, a library science classroom, conference room, seminar rooms, staff lounge and a kitchen.

aluminum display cases at various points on each floor, the cork bulletin boards, the book chute in the main entrance for those returning books when the library is not open, and the coat rooms on the first and second floors. The latter are particularly important because students who have no place to check their coats are likely to use a valuable extra seat for that purpose, cutting down the capacity of the rooms.

Windows on all south and east walls are treated in draperies in a wheat shade of fortisan which blends with the natural oak paneling. Windows on the north have fiberglas draperies of the same shade. In the library science classroom and the conference room, the draperies have been lined with black Indianhead in order that audio-visual equipment may be used.

Capacities and Uses

The present seating capacity of the library is estimated at 325 and the book capacity at 84,500. It should be pointed out that all space within the building, except the audio-visual center, can be converted to actual library use when such need is indicated.



Supplementing the classroom and laboratory facilities (upper left) of the fisheries management program at Humboldt State College are the fish hatchery, six outdoor rearing ponds, 101-foot long twin raceways, a 50,000-gallon capacity water tank and irregularly shaped earthen pond.

HUMBOLDT STATE COLLEGE WILDLIFE MANAGEMENT PLANT

by LAWRENCE E. TURNER

Executive Dean, Humboldt State College, Arcata, California

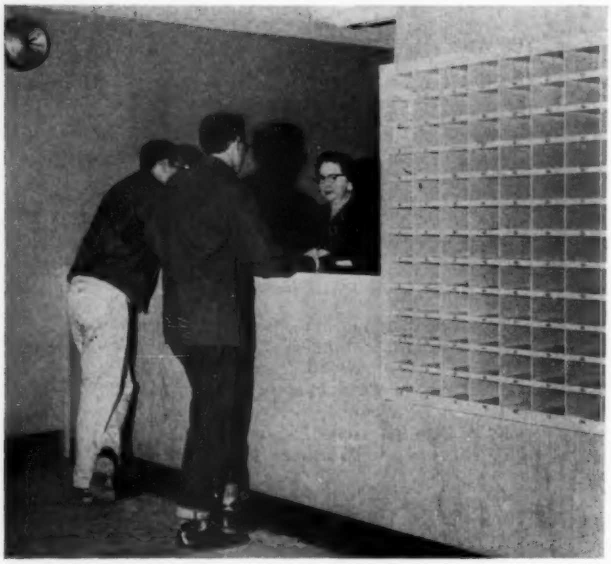
Dr. Turner received his bachelor degree from McPherson College, Kansas, and his master's and doctorate from the University of California at Berkeley. He held teaching and administrative posts in various Idaho and California school systems for 13 years. Prior to taking his present position in 1951, Dr. Turner was professor of educational administration at the College of the Pacific at Stockton, California.

HUMBOLDT State College at Arcata is situated in the heart of northern California's redwood empire. Because of its location the college has been designated by the state to offer a course of study for those who will occupy professional positions related to the management and conservation of wildlife resources.

The college is fully accredited to confer bachelor and master of science degrees with majors in either fisheries or game management. Although much course instruction occurs out-of-doors in the nearby forests, rivers, lakes, bays, lagoons, meadows and the Pacific Ocean, basic lecture and laboratory experience is provided in the new Wildlife Management plant on the campus.

The present plant consists of several major elements which have both indoor and outdoor facilities. The largest building houses classrooms, offices, laboratories and related spaces. Adjacent to the classroom

Designed by the California State Division of Architecture, the Wildlife Management Plant is located at the southeast corner of campus.



Individual mail boxes are situated near the centrally-located reception desk in the classroom building for easy communication with the students.

building is the fish hatchery with necessary water system, rearing ponds and raceways.

Also on the site is the fur shed where furbearing animals are raised under commercial and experimental conditions. For the game bird courses there is a brooder shed with pens for study and experimentation on pheasant, quail and other wild game birds.

In the future it is planned to construct at least two additional units. The first is a marine station which would be erected at a site either on the Pacific Ocean or Humboldt Bay. The second is an earthen dam to impound creek water in a deep gulch adjacent to the campus. This dam will provide a lake with depth for certain fisheries experiments and for use as a waterfowl refuge when working with such game birds.

Participants in Design

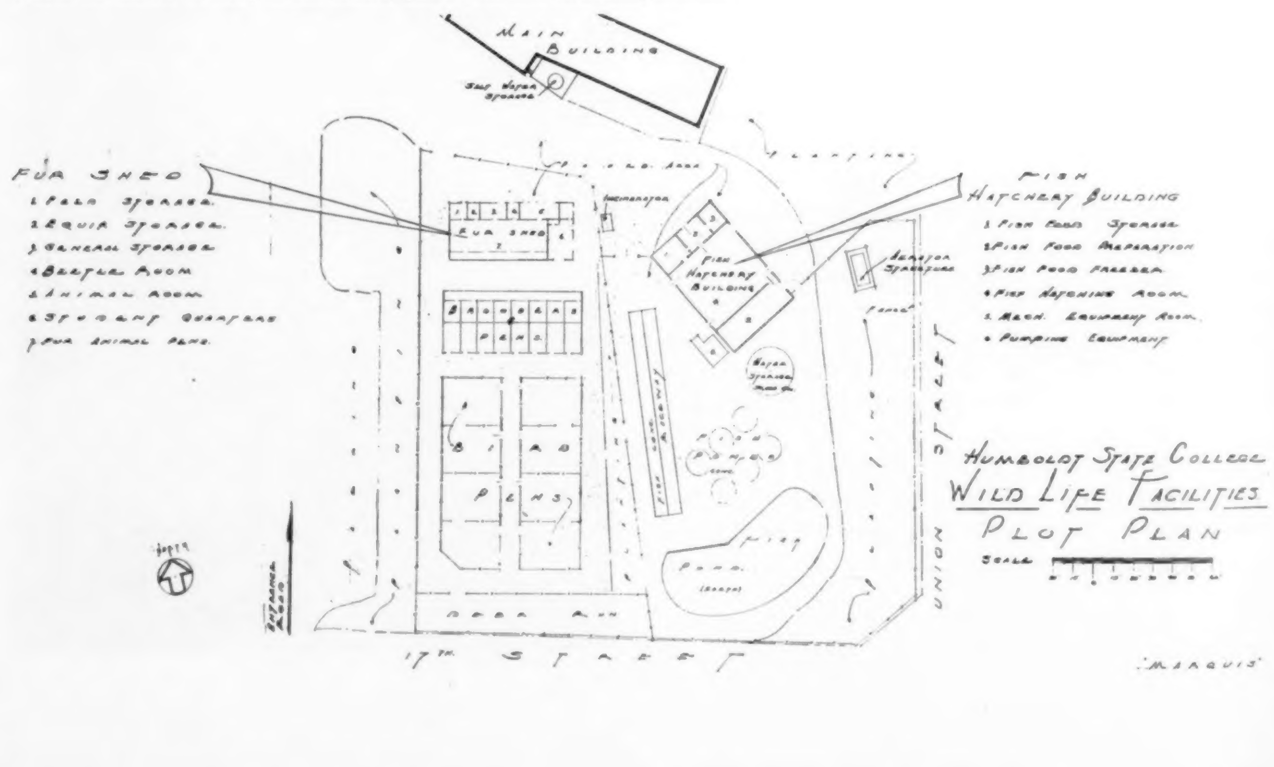
The Humboldt State College Wildlife facilities were designed by the State Division of Architecture in the Division of Public Works, Sacramento, California. The division is administered and directed by the state architect, Anson Boyd. Many of the specialist architects and engineers employed by the division made a contribution to the plans and it is, therefore, impossible to name each one of these.

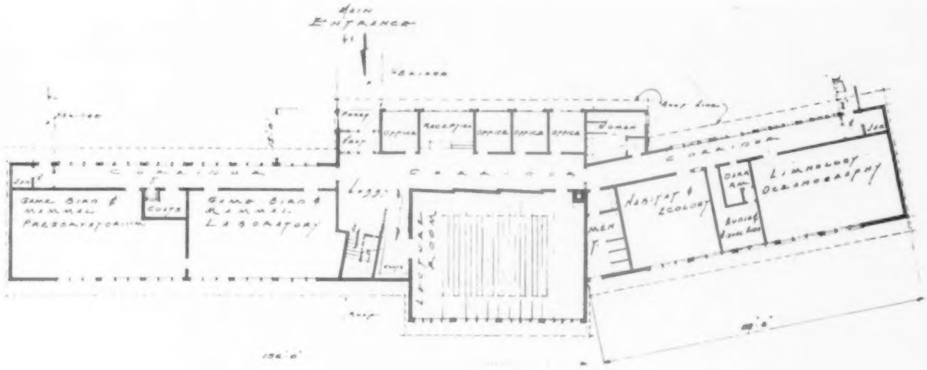
Basic designing was done by the design section of the division under the supervision of Arthur F. Dudman. Budget designs were prepared by the late Vladimir Oglou, and construction designs, from which working drawings were made, were drawn by Harold Marquis. Water systems, heating, refrigeration and the like were designed by the mechanical section of the division under the supervision of Carl A. Henderlong.

Structural engineering studies were made by the structural section of the division under the supervision of Allen H. Brownfield. Electrical designs were by the electrical section of the division under the supervision of Stuart R. Davies. Landscaping plans were prepared by William Seabury of the landscape section, which is supervised by Donald Van Riper.

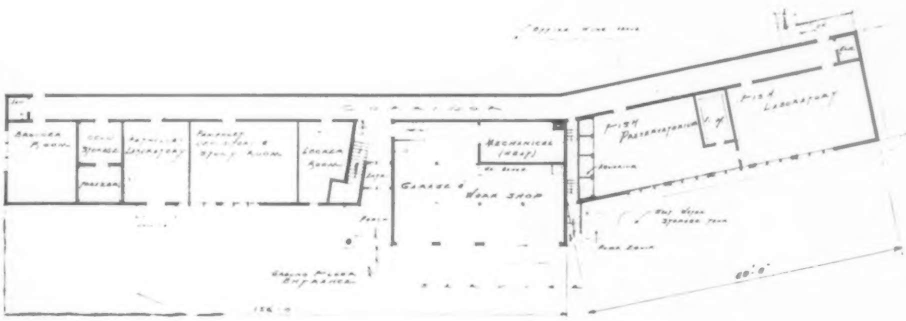
The plant is at the southeasterly corner of the college campus and comprises a site area of slightly more than three acres. Since the site is on a slope, various elements of the plant are constructed at different levels. Arcata is in an area of California where as much as 50

The Wildlife Management Plant at Humboldt State College is unique in its provisions for courses of study in fish culture, game birds and furbearing animals.





Located on the first floor of the classroom building are the administrative offices, reception room, large lecture hall, game bird and mammal laboratory and preservatorium, a wildlife habitat museum and the limnology and oceanography laboratory.



The ground floor of the classroom building houses the fish preservatorium and laboratory, brooder room, cold storage and freezer, pathology laboratory, storage and other service spaces.

inches of rain fall in one year, necessitating particular attention to drainage, both surface and subsurface.

Exterior finish of the structures is redwood, employing a variety of patterns for a pleasing appearance. Redwood used was all clear heart grade in accordance with rules of the California Redwood Association. The framing lumber was, for the most part, douglas fir of grade "B" or better, and structural timbers and beams were of appropriate "select" grades.

Where ponderosa or sugar pine was used, grades 1 and 2 clear were required. Fir and pine grades were those required by the West Coast Lumbermen's Association. Specifications for the plant were written by the Division of Architecture, and were approximately 430 pages in length.

Financing the Plant

Because of budget considerations, the plant was financed in three succeeding sessions of the California Legislature. Basic site preparation (including clearing trees from a portion of the site), the classroom building and the fish hatchery building were financed at the 1953 session by an appropriation of $389,000. In 1954 the water system and outdoor fisheries facilities were financed with an appropriation of $85,200. In 1955 an appropriation of $62,900 provided for the fur shed, the brooder house and bird pens and incinerator.

This method of financing resulted in a long construction period extending from the spring of 1954, when site clearance and development began, to the spring of 1957, when the last of the drainage system and fencing was completed. The classroom building was opened at the beginning of the 1955 fall semester with ceremonies participated in by the state director of education, Dr. Roy E. Simpson. The completed structure was dedicated on October 19, 1957, with a number of state officials present. The entire plant was equipped with appropriations totaling $96,900.

Classroom-Laboratory Building

Instructional facilities included in the main building are of many types. They may be roughly classified as instructional rooms, storage rooms and miscellaneous areas.

The general instruction rooms found in the building are general purpose classrooms and laboratories. The smaller of the two general purpose classrooms has

The large lecture room has seats on graduated risers so that students in any location have unimpeded view of demonstration table.

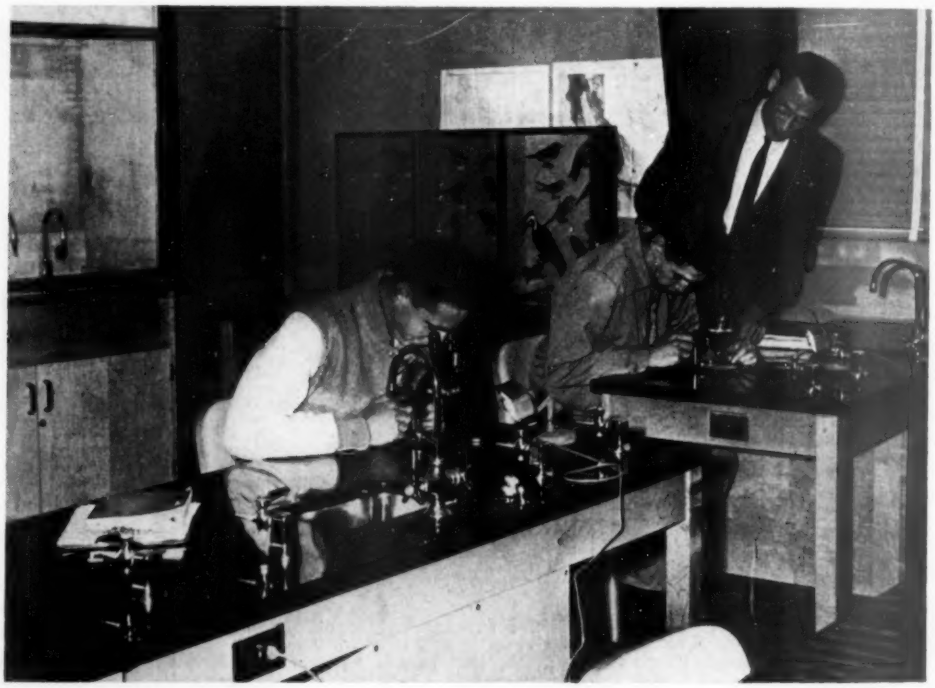
The fisheries preservatorium is adjacent to the fisheries laboratory and is used for cleaning and storing specimens to be studied.

room without opening windows. The walls are oak plywood panels, finished with a gray wax stain. Painted exposed beams and acoustical tile finish the ceiling.

Four laboratories are provided in the building. The oceanography-limnology laboratory has equipment similar to an advanced chemistry laboratory to permit chemical analyses of salt and fresh water. The game birds and mammal laboratory and the fisheries laboratory are similar to advanced biological science laboratories, adapted to the particular studies conducted in them. The pathology lab has a veterinarian's surgical table to permit dissection of large animals in the study of anatomy and disease.

The douglas fir plywood used in all classrooms except the large lecture room serves for structural purposes as well as a finish material. For structural strength, flat headed nails were required, but they are carefully arranged in a pattern that lends itself to the decor of the rooms. The plywood is finished with a silver gray wax stain.

The mammalogy laboratory is equipped for advance biological science studies and for conducting special experiments and projects.



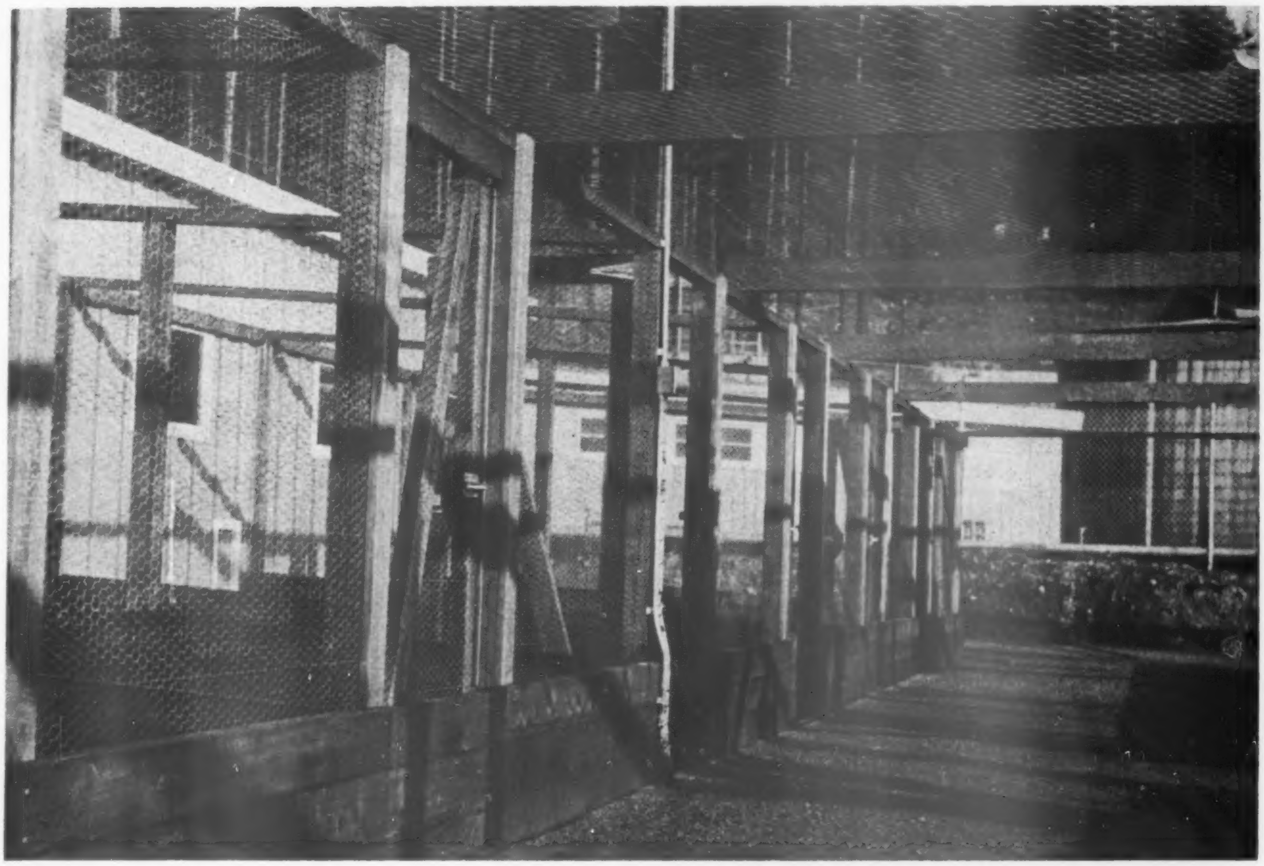
25 student stations and is equipped with shelves. It serves as a document room as well as a classroom. The larger lecture room is designed for beauty and utility. It is equipped with 140 upholstered, fixed seats that have attached tablet arms which fold out of the way when not being used.

The seats in the lecture room are installed on graduated risers in a staggered manner, so that a student in any location may have unimpeded view of the demonstration table at the front of the room. The room is planned for the use of projected audio-visual materials. Darkening is achieved by means of permanently installed Venetian blinds at the windows. Mechanical heating and ventilation make it possible to use the

The storage of specimens for laboratory work constitutes a problem in wildlife study. Certain specimens are stored in museum cases in the habitat and ecology room. In this room specimens are arranged in natural life settings by classes, teaching students to recognize the indication of these animals when found in the woods or prairies.

Items for dissection are stored in two cold rooms in the building. One room can be cooled to 0° Fahrenheit; the other to 20° Fahrenheit. In these cold rooms are placed all types of fish, birds and mammals until they are needed for dissection in the laboratories.

The fisheries laboratory and the game bird and mammal laboratory have adjacent rooms called pre-



The bird pens are completely enclosed for protection with chain link fencing and have movable dividing fences for any possible combination of these pens.

servatoriums. Each of these rooms is about the same size as the lab, and is used to store specimens studied in the laboratory. It is estimated that about 20,000 bird and mammal specimens and 10,000 fish specimens are stored in the preservatoriums. Many bird and mammal types are kept in dustproof, mothproof and vermin proof metal cases. For ease in locating individual items, standard indexing systems are employed.

The Wildlife Management building contains five single station faculty offices. There are 140 individual pigeonhole mail boxes which are assigned to students taking courses in the wildlife departments. These solve the problem of communicating with students between class sessions or special appointments.

Since photographs are used in teaching many courses, the building includes a well equipped darkroom for use by faculty and students. Pictures taken in connection with classes, assignments or research projects may be developed and printed here.

Classes frequently make field trips into the surrounding area for practical, on-the-spot studies. The wildlife plant, therefore, has a garage for vehicles, boats and other similar equipment. Part of this room is a workshop where equipment is kept in repair. Fish nets and other gear used in salt water are washed in a shower, and nets are suspended to dry in this room. Students change from their street clothes before leaving on field trips, and clothing lockers are provided in the dressing room.

Four Large Aquariums

A special feature of the fisheries preservatorium is the installation of four large aquariums. These are designed so that either fresh or salt water can be circulated through any one of them without affecting the other three. The aquariums are six feet long, four and one-half feet wide and hold water to a depth of four and one-half feet. They are constructed of concrete. The front panel is equipped with specially constructed mountings for one-inch thick plate glass set in neoprene rubber gum and caulk.

The salt water system, including a 500-gallon redwood tank, filter and circulating system, was designed especially for the aquariums. Fresh water is piped from the fish hatchery. Since even small amounts of copper, iron, alkali and other substances are lethal for fish, plastic pipe, valves and fittings are used throughout.

A corridor with an elevated floor, behind the aquariums, was provided for caring for the fish, cleaning tanks and other necessary work. Each aquarium is illuminated with moisture proof incandescent fixtures.

The designer made excellent use of color in decorating the Wildlife Management plant. Exteriors of all buildings were painted to simulate natural redwood

Four large aquariums are located in the fisheries preservatorium and are designed so that salt water may be circulated in any one of them without affecting the fresh water in the others.

with a yellow trim. Judicious use of modified shades of rose, green and blue on plastered surfaces makes the interior cheerful and attractive without adding materially to the cost. Floors are covered with harmonizing shades of asphalt tile, except in the laboratories where the floors are covered with vinyl tile, resistant to acids, alkalis and alcohols.

In rooms where douglas fir plywood was used on the walls, the grain of the wood shows through the stain wax finish. Chalkboards in classrooms and laboratories are of rose, green, tan or blue color, as determined by the color of the walls. All ceilings in the classroom building are finished with white acoustical tile. In the fish hatchery and other units, ceilings are covered with an off-white paint.

Two Decorative Elements

Two unusual decorative elements are found in the building. The supporting pillar of the canopy over the southerly entrance has the shape of a totem pole. The pole was designed and carved by a graduate student in art who copied genuine figures from totem poles of ancient Indian tribes in Northwestern California. The figures are combined to typify the instructional programs for which the building was planned.

The second decorative feature is a memorial redwood bas-relief, approximately six feet wide and twelve feet high, which hangs in the main stairwell of the building. The bas-relief was designed by an art student to symbolize the conservation of natural resources, and was carved by sandblasting. These two features add much of interest to the classroom building, but cost little to provide.

Fish Hatchery Facilities

The fish hatchery is a laboratory for courses related to fish hatchery management, and also has facilities for experimentation in matters of fish culture. The building is 65 feet long and 40 feet wide, and includes the hatchery room, a cold room, a food preparation room and office, and a room to house the filtration and circulation equipment for the water system.

The hatchery is equipped with 20 troughs, arranged in units of four. Some are made of aluminum, and others are wood, for comparative purposes. The cold room provides food storage for the fish in the hatchery, and can be cooled to a temperature of 20°F. The room next to the cold storage area has a butcher's block, heavy duty grinder, etc., and is used for preparing the fish food.

In the food storage room the technical assistant in charge of operating the hatchery has his headquarters, and all records for the hatchery operation are kept here. Graduate students with projects do some of their work in this room. Fish raised in the hatchery are transplanted, as part of the instructional program to streams, lakes and bays in cooperation with the California Department of Fish and Game.

The water system includes a weir in a creek bed approximately a quarter mile from the plant. The weir collects natural creek water for the hatchery. The system is set up to use water directly from the creek, but provision for filtration and recirculation is made should the water supply become inadequate at any time. Pumps to circulate water through the system are powered by electricity, but stand-by gasoline power is installed which automatically goes into operation in case of a power outage.

The system provides for evaporative cooling of the water and, since the mean temperature in Arcata during the warmest month is 55°, it is felt that, for most fish culture projects, the water temperature can be adequately controlled. Provision for individual refrigeration or heating of water in specific troughs has been made

The mammalogy preservatorium has dust and vermin proof metal cases for storing specimens studied in game bird and mammalogy courses.

so that installation can be made when projects necessitate it. Fresh water is stored in a 50,000-gallon capacity redwood tank. The fresh water system is connected to the large aquariums in the main building.

Rearing Ponds and Raceways

Beyond the hatchery building are the rearing ponds and raceways. There are six concrete circular ponds with an interior diameter of ten feet. They are eighteen inches deep at the outside, and twenty-four inches deep at the center. Twin raceways are each 104 feet in length, 4 feet deep and 6 feet wide. Checkboards are installed at intervals of twenty feet.

A large earthen pond completes the outdoor fisheries facilities. It is irregular in shape, 75 feet long and 35 feet wide. At its deepest point the water is six feet in depth.

To protect the fisheries plant from all predators, it is entirely enclosed in a chain link fence that is described as "man-proof and rat-proof." The design of the fencing involved difficulties because gates that would meet requirements could not be obtained. This appears to be solved with the installation of gates equipped with overlapping sheet metal guards that close tightly against a concrete stop at the bottom. The area between the ponds and raceways, as well as the nearby roadway and parking area, is covered with a two-inch bituminous plant mix, with a single class B seal coat, over a four to six-inch compacted crusher-run rock base.

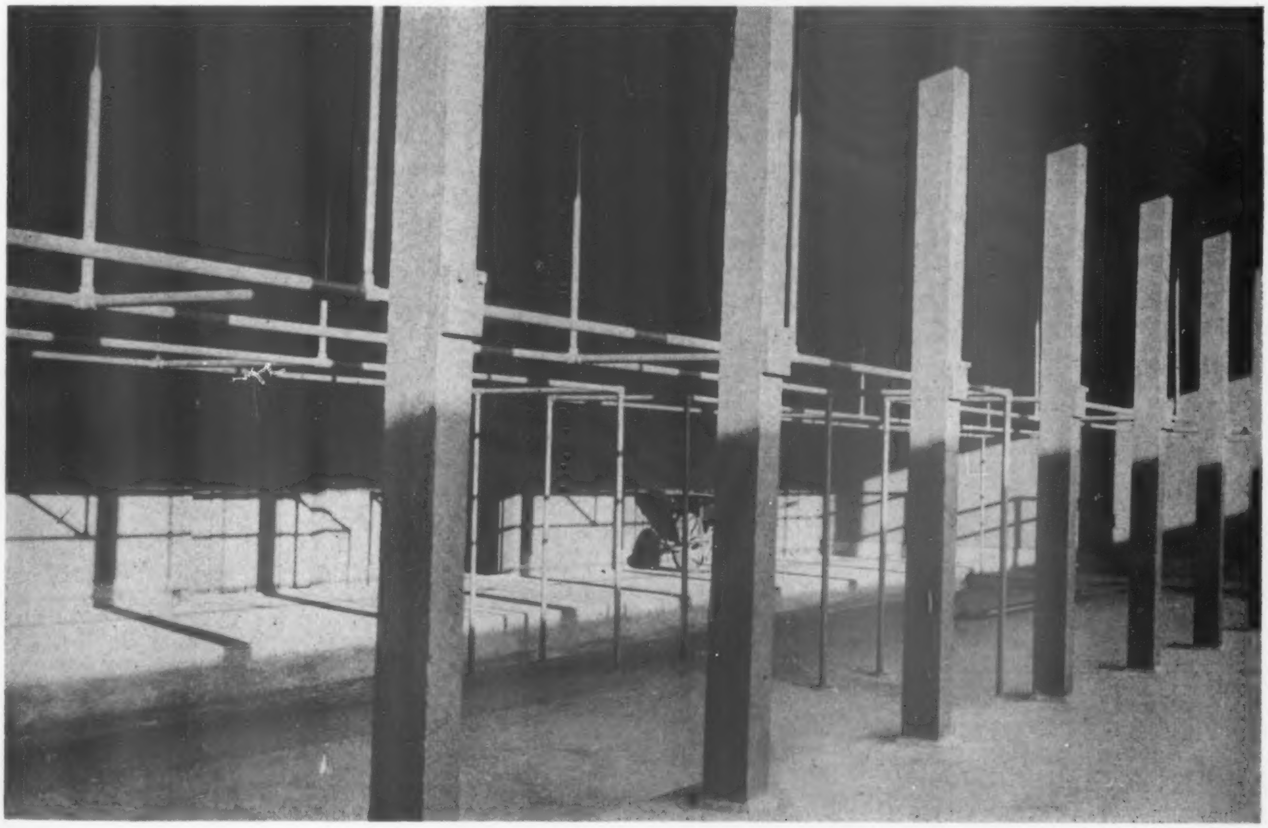
The Fur Shed

In addition to the conservation problems of furbearing animals in their natural habitat, the curriculum at Humboldt State College is designed for students who wish to raise furs commercially. There is a small, well equipped shed where different types of furbearing animals may be raised. This building also houses a laboratory where many experiments pertaining to furbearing animals are carried out.

The animals are kept in 54 pelting pens that are 18 inches wide, 36 inches deep, and 16 inches high. They are set on a steel framework which is imbedded in the concrete floor. Under the pelting pens is a depression into which fall the droppings from the animals. All corners of the depressed floor area are coved, and the floor slopes to sewer connections to permit regular cleaning. The outer animal room is open on the southerly exposure, but animals are protected from the weather by hinged wooden shutters that open or close.

The building also contains a specially constructed vermin proof room for storage of grain feed for animals and for the birds in adjacent brooder houses and bird pens. Since wheelbarrows and other large equipment are used, an equipment room is provided, as well as a

The fur shed has steel framework mountings for 54 pelting pens in which small furbearing animals may be raised. Under the pens is a gutter coved at the corners and sloping to sewer connections for easy and regular cleaning.



general storage room for various teaching and operational supplies. The inner animal room will serve for special research projects by graduate students.

A Colony of Beetles

A special room in this building is the so-called beetle room. Here will be housed the dermestid beetle colony, planned to serve not only the wildlife departments specifically, but also the biological sciences of the college. Uncleaned skeletons of animals as large as sheep can be placed in the hive for the colony of beetles to clean of all meaty particles. The hive is heated and ventilated.

Since the plant in operation has live animals, birds, fish, as well as mechanical devices that need constant oversight, a dormitory room has been built into the fur shed to house student assistants employed for the pur-

The southerly entrance of the Wildlife Building has a totem pole for the supporting pillar of the canopy. The totem was designed and carved by a graduate art student.

pose. This room has a private bath. Warning systems have been installed to notify the student of the failure of any of the mechanical devices, and immediate steps can be taken to prevent loss of fish or animals.

Provision for incubation of game birds is made in the main building, but the newly hatched birds are transferred to brooder houses to mature. There are eight separate units equipped with electric brooders. Each unit has a small outdoor brooder run for use as the birds grow.

Movable Dividing Fences

A link chain, man-vermin proof fence encloses the perimeter of the eight bird pens. The dividing fences are movable, making possible the combining of any or all of the pens, which are covered with checker netting stretched taut to prevent birds from flying away. At the proper seasons the birds raised in these facilities are banded and planted in the surrounding area.

The pens may be serviced from trucks which are driven either around or through them. The ground surface near the pens has been black-topped.

To provide a place to study large game animals for short periods of time, a deer run has been erected. The run is surrounded by an 8-foot fence and is covered with wire netting to prevent the deer or other animals from jumping over.

Landscaping the Site

The landscaping plan incorporates as much of the natural surroundings as possible. Steps and walks to the north front of the building lead through a small grove of second growth sequoia sempervirens. Several stumps of the virgin redwood were preserved in keeping with the idea of a natural setting. Along the periphery of the Wildlife Management plant sequoia sempervirens were set out which, in a few years, will provide not only beauty for the area, but also a screen from the nearby streets.

On slopes various types of ground cover have been planted such as cotoneaster, variegated ivy, hypericum and juniper. Accents of barberry, varieties of broom and escalonia give variation to the site. Twenty-five altaclarense rhododendrons near the building complete the planting plan.

Late burning lights are beacons of activity and progress in the Physics and Electrical Engineering Research Building at Illinois Institute of Technology. Building was designed by Ludwig Mies van der Rohe.

PHYSICS AND ELECTRICAL ENGINEERING RESEARCH BUILDING

by LOUIS L. SANTORO

Manager, Research Services, Armour Research Foundation, Illinois Institute of Technology, Chicago, Illinois

Mr. Santoro has been associated with Armour Research Foundation for nearly six years, the last two as manager of research services. Before joining the Foundation, Mr. Santoro was building superintendent with the Wurzburg Department Store of Grand Rapids, Michigan, for whom he acted as owner's representative in expediting the construction of the firm's multimillion dollar home. He was also building superintendent with Butler Brothers, huge Chicago wholesale establishment.

MODERN researchers in scientific and engineering fields require a proper physical climate in which to work and up-to-date tools if an efficient research operation is to result. These were prime considerations in planning the new Physics and Electrical Engineering Research Building of the Armour Research Foundation at Illinois Institute of Technology, dedicated April 23, 1957.

This building, incidentally, was the 20th modern structure to rise at Technology Center, as the Illinois Tech educational and research area is known, since the Institute's redevelopment program was launched little more than 12 years ago.

Currently being built are an electrical engineering and physics classroom building, which is expected to be ready for occupancy with the beginning of the fall term; a third building of the Association of American Railroads Research Center, which is located on the campus; and a large addition to the Metals Research Building.

Dedication of the Physics and Electrical Engineering Research Building also marked the completion of the first step in Armour Research Foundation's current 5 million dollar, 10-year expansion program. This program calls for the construction of three buildings and substantial additions to two others.

The research building, like other modern structures on the campus, was designed by Ludwig Mies van der Rohe, director of Illinois Tech's Department of Architecture, and author of the unified architectural plan for Technology Center. The new building houses the nation's first nuclear reactor designed specifically for industrial research. It is a four-story, basement and penthouse structure, of brick and reinforced concrete construction, containing 77,340 square feet of floor space.

The penthouse is an all wood and glass constructed

The Physics Research Department occupies the first floor of the research building, shown here, as well as the basement and second floor. Investigations are conducted in reactor and nuclear systems, among other projects.

laboratory which provides the open space needed for antenna research. The reactor room, situated in the western end of the building, extends from the basement through the second floor. Building cost, including the reactor, was approximately $1,800,000.

Designed for Research Activities

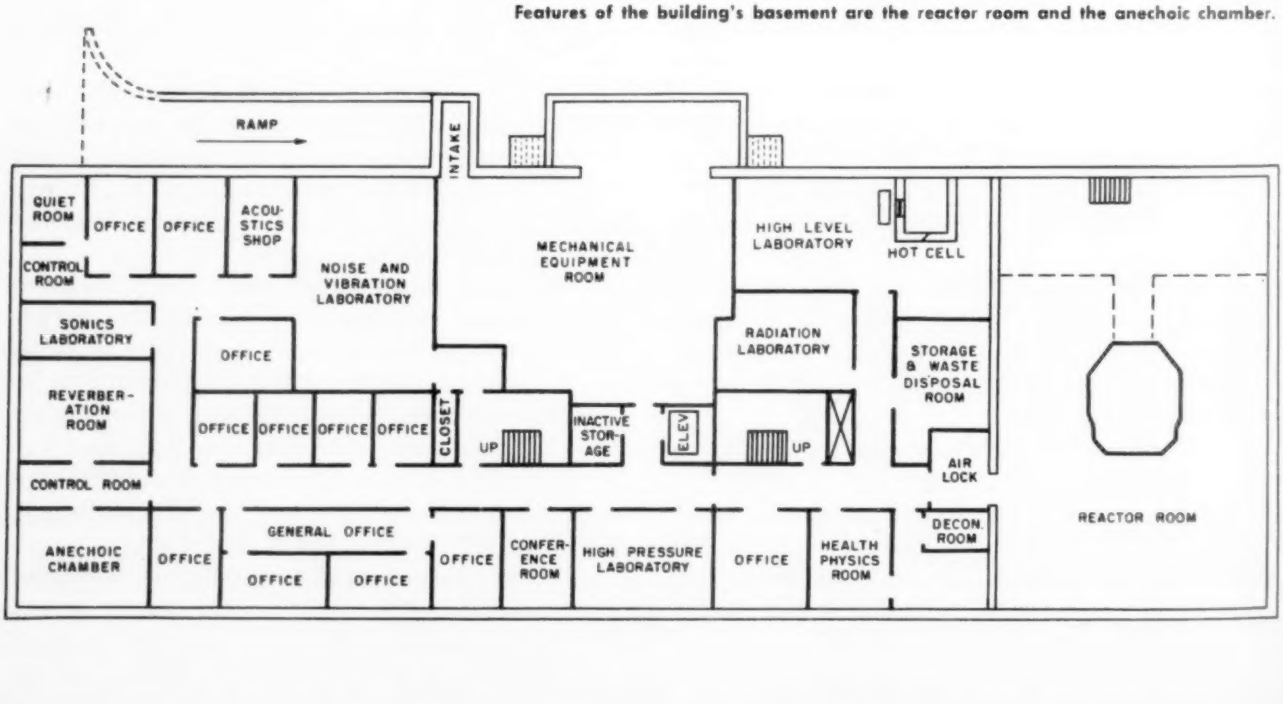
As its name implies, the new structure is devoted to research in physics and electrical engineering. The Physics Research Department occupies the basement and first two floors. Investigations are conducted in the physics of solids, light and optics, acoustic design, sound and vibration control, electricity and magnetism, and reactor and nuclear systems.

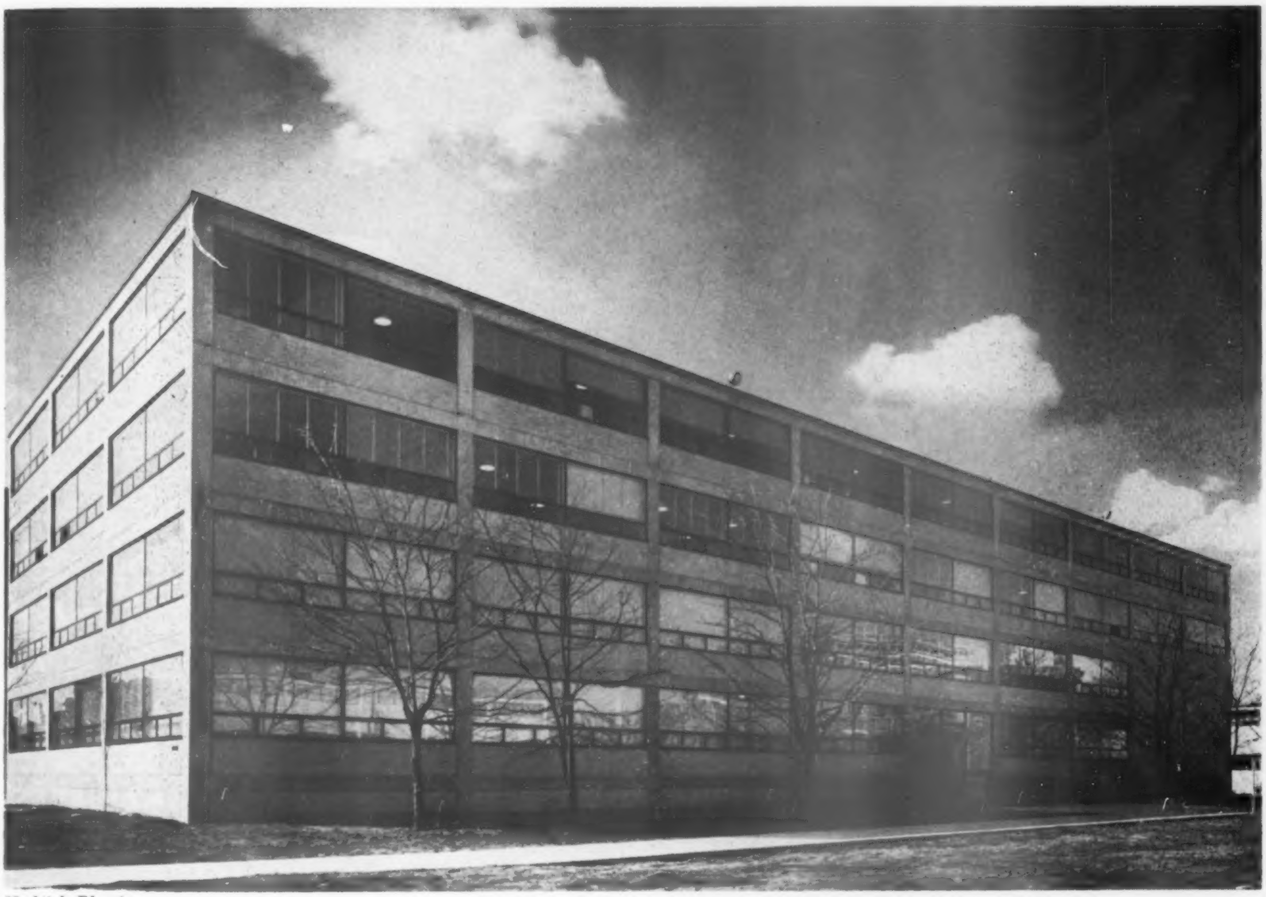
Floors three and four and the penthouse are given over to the work of the Electrical Engineering Research Department. Studies are carried out in the areas of communications and radio frequency applications, electronic instrumentation, computer systems, mathematical services, electric machines, components and measurements, and control systems.

Cooling and Heating Systems

The PEE building is equipped with a year-round

Features of the building's basement are the reactor room and the anechoic chamber.





Hedrich-Blessing

The new building houses the nation's first nuclear reactor designed specifically for industrial research.

Only authorized personnel may pass through this door to the reactor control room. Control board is seen through the door.

air handling system of eight units to regulate cooling and heating. Hot air heating is supplemented by strip convectors under window sills, both regulated by a unique system of thermostatic controls.

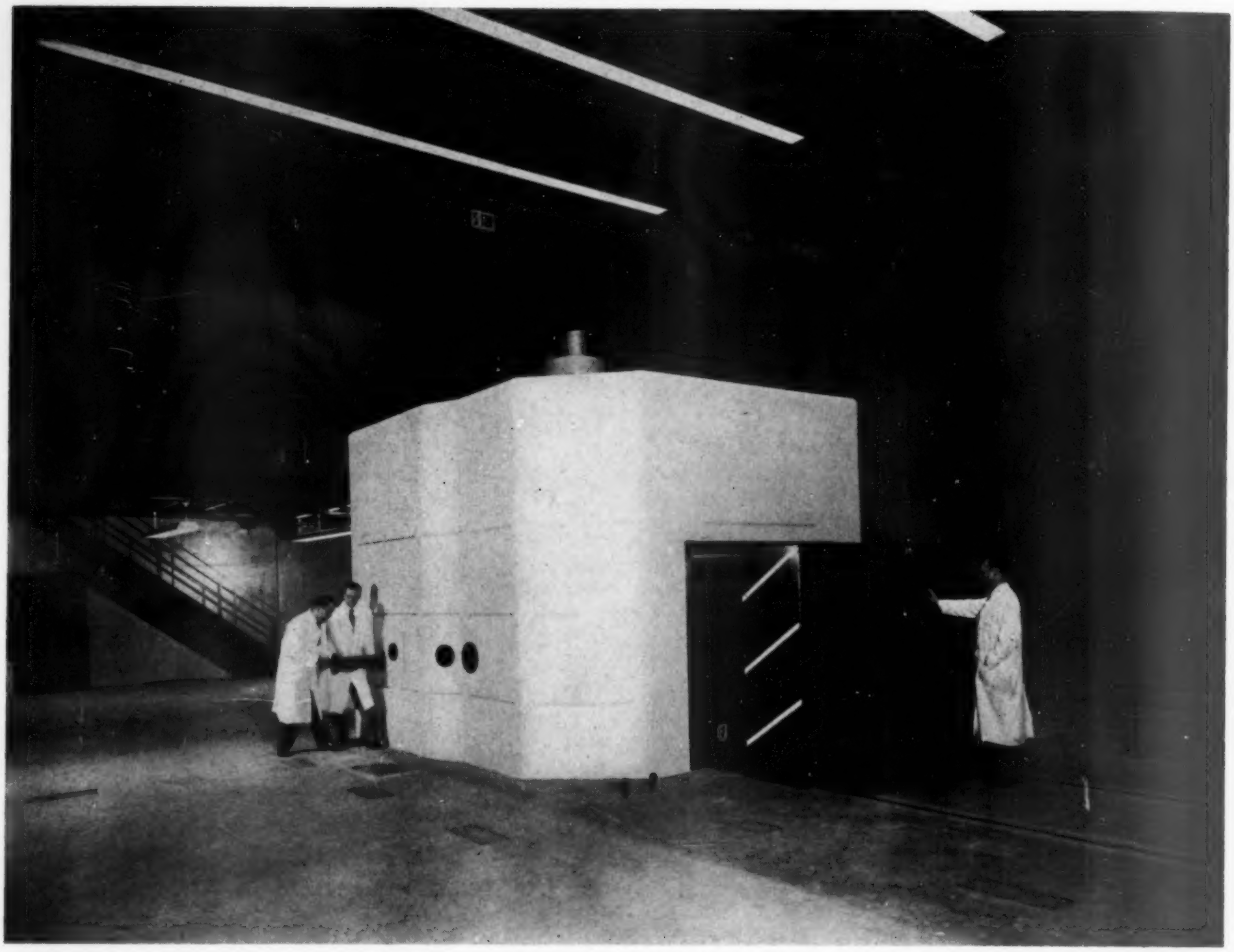
Separate systems circulate fresh air in the nuclear reactor room and associated "hot labs" and keep these rooms at slightly negative pressure to assure the flow of all air toward the reactor. There is also a triple containment system which has been studied and approved by the Atomic Energy Commission.

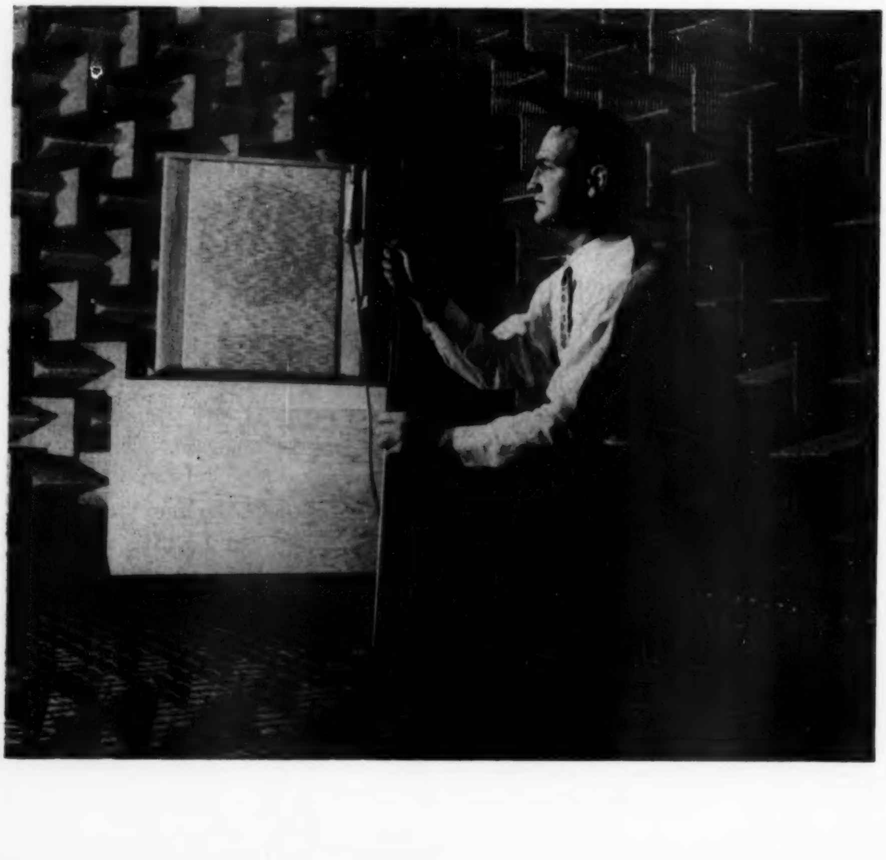
Modular Bays for Flexibility

Modular bays make possible relatively easy and inexpensive expansion or contraction of laboratory space. The smallest module is 17 feet by 12 feet. Concrete block partitions can be relocated to expand a laboratory area to 17 feet by 24 feet, or in multiples of 12 feet of length up to the entire length of the bay, if needed. Similarly, large areas can be reduced or divided.

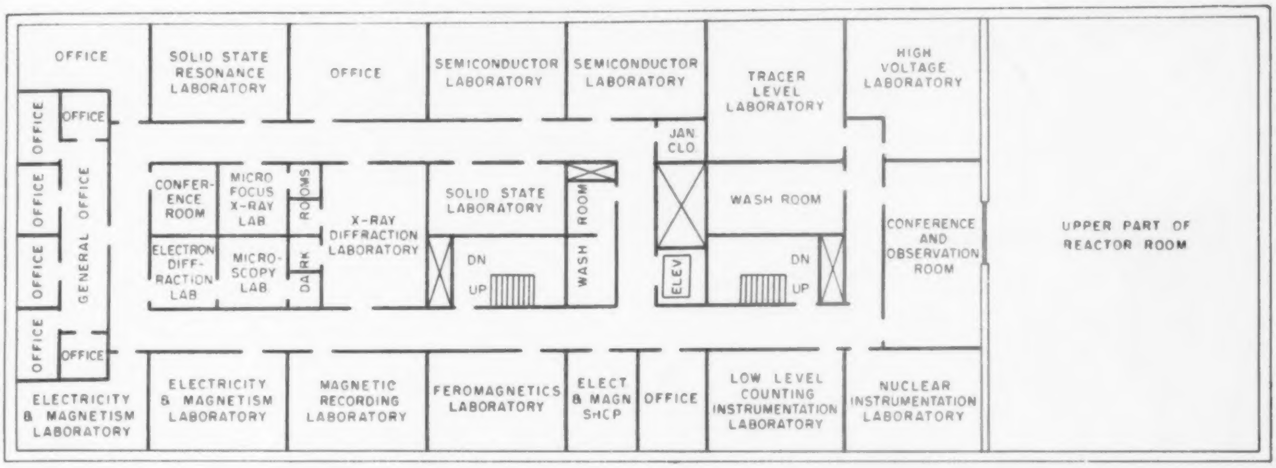
Expansion or contraction of area can be accomplished without the necessity of changing the lighting or air-conditioning arrangements, and with a minimum rearrangement of facilities. Both fluorescent and incandescent lighting are used in the building.

Consolidation and expansion of research programs were two principal benefits derived from the construction of the building. Electrical engineering research formerly was carried on in two buildings. The increased





The unique research tool of the new building is the first nuclear reactor for industrial research (above). In the anechoic room (left) fiberglas wedges, in intricate pattern, face all surfaces. Wedges can be seen below the cable flooring. One of the Foundation's research physicists is making adjustments on a microphone preparatory to taking measurements on a loudspeaker.



Second floor of the building features the upper part of the reactor room, which reaches up from the basement level. Other areas are for physics research in various stages.

Reception area of the building provides comfort for sessions with visitors, see above. Third floor, below, houses electrical engineering research.

space now available makes possible additional and improved research tools.

Nuclear Reactor for Industry

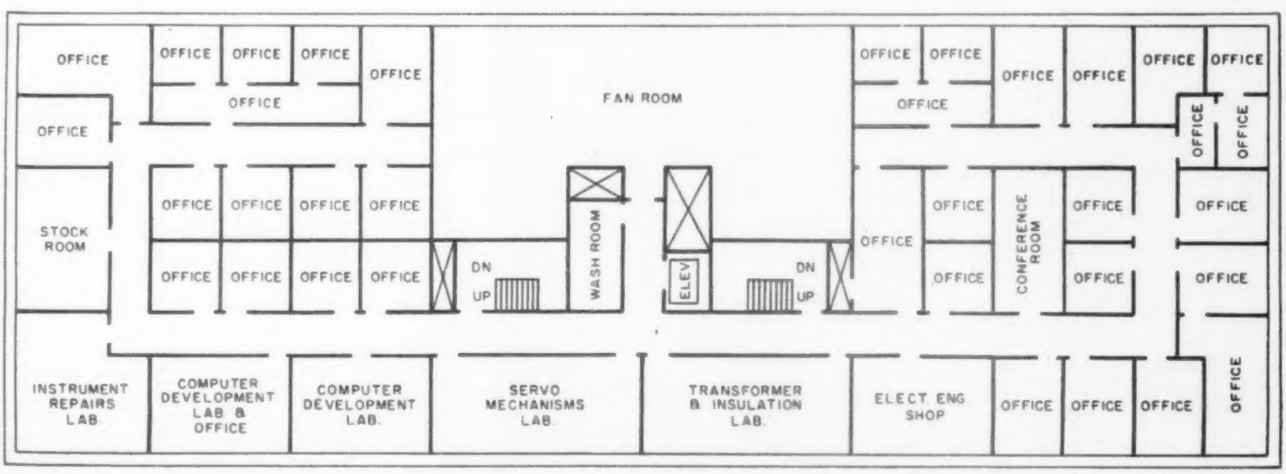
With the Armour Research Foundation nuclear reactor, industry now is able, for the first time, to conduct reactor studies without security restrictions and military competition. The reactor is free of all restrictions other than those called for by technical common sense. No secrecy of any kind is necessary beyond the protection of individual sponsors' programs.

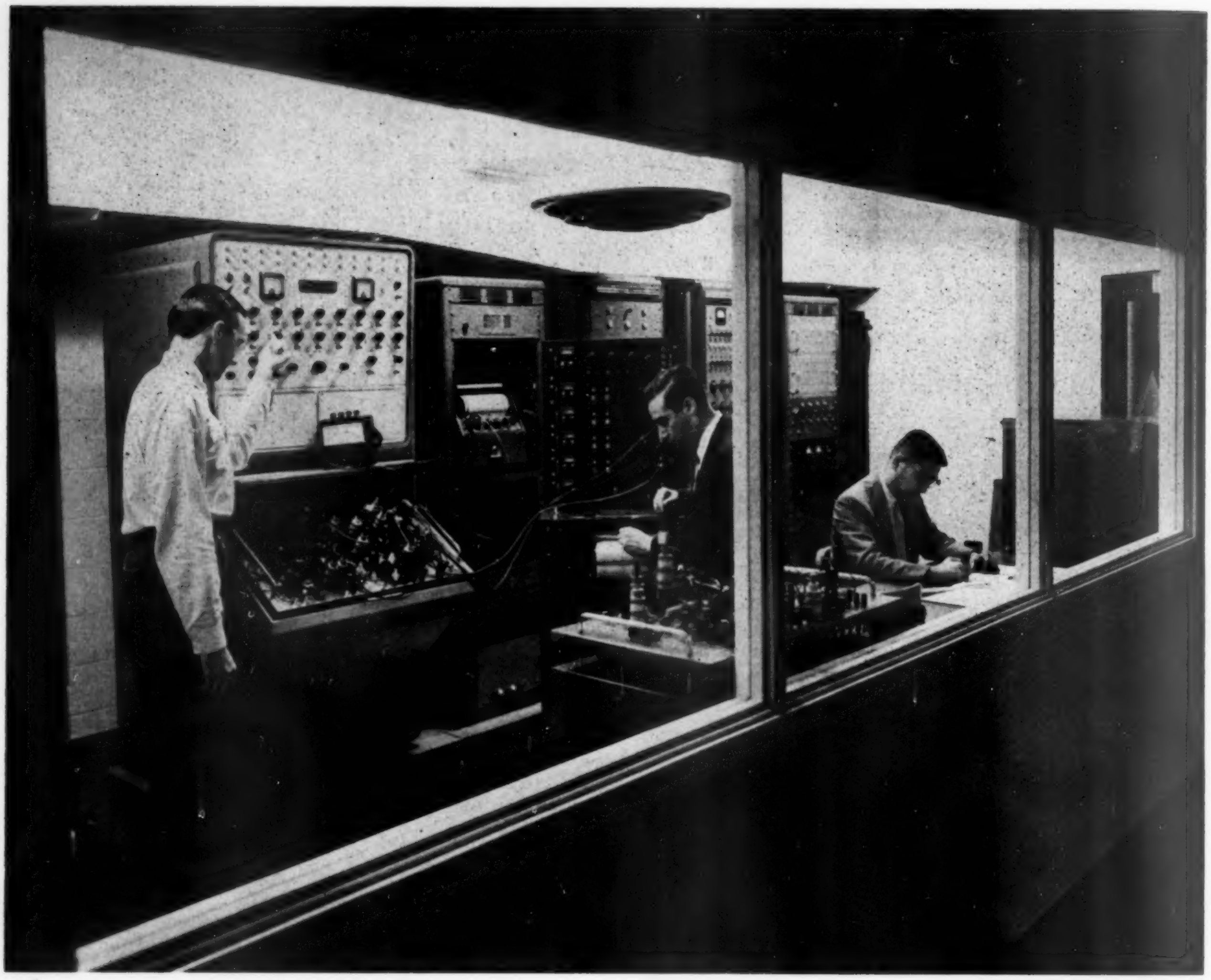
This is also the first nuclear reactor to be built in a densely populated area since Fermi's original reactor under the stands of Stagg Field at the University of Chicago in 1941. Its potential uses are many, some of which are listed below:

1. *Production of short-lived radioisotopes*—useful in hundreds of diagnostic and tracer techniques.

2. *Neutron activation*—provides a means of tagging materials in place and makes possible a highly sensitive method of elemental chemical analysis.

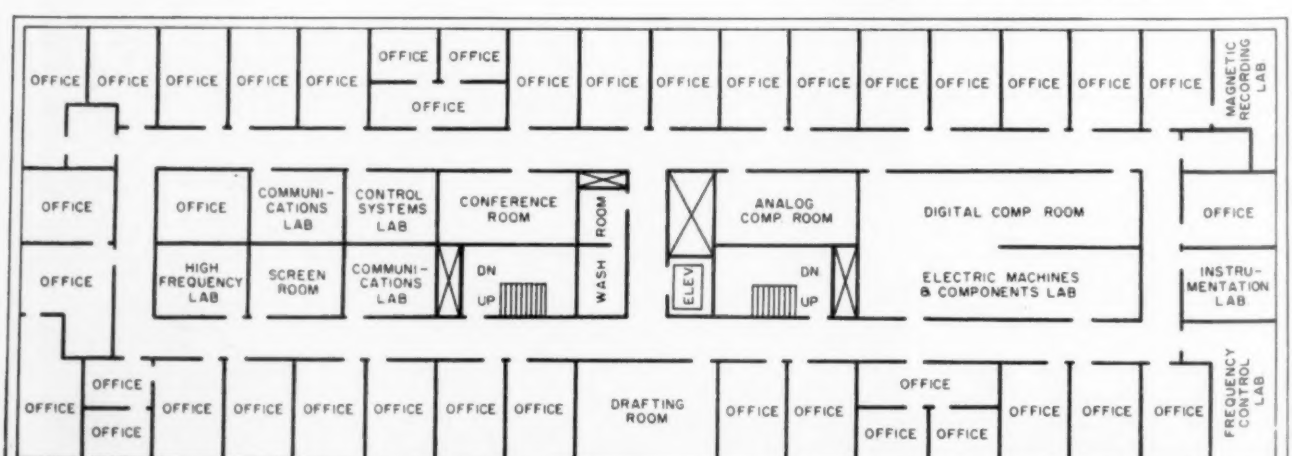
3. *Neutron diffraction*—structure analysis potentially more powerful than standard X-ray diffraction techniques and valuable in the study of organic compounds, hydrogen and oxygen in solids, anti-ferromagnetic materials and other areas.





The analog computer is used to measure and predict the dynamic performance of physical systems. Not shown is a digital computer for statistical analysis of accounting and engineering data.

Fourth floor is also occupied by the Electrical Engineering Research Department. Studies are carried out in the areas of communications and radio frequency applications, electronic instrumentation, computer systems, mathematical services, electric machines, components and measurements, and control systems.



The subjective effect of a loudspeaker is being studied against a backdrop of noise echoing from the zigzag walls of the reverberation room.

4. *Radiation effects*—effects of radiation on chemical reactions, plastics, glasses, organic systems and certain metallic alloys.

5. *Biological studies*—effects of radiation in biological systems.

Twenty-four industrial companies are participating in the nuclear reactor program. Each contributed $20,000 toward the construction and initial operation of the facility in return for a share of the benefits obtained in three years of exploratory research.

Anechoic and Reverberation Chambers

Two other "built-in" features are the anechoic and reverberation chambers. Obviously, the two are opposites in construction as well as function. The anechoic room is structurally isolated from the main building by

The atomic reactor is run by a technician from a control board which overlooks the reactor. Reactor studies are conducted without security restrictions and military competition. No secrecy is exercised beyond measures necessary to protect individual sponsors' programs.

special features of construction. All surfaces are faced with glass fiber wedges, about two and one-half feet long. At frequencies above 100 cycles per second, more than 99.99 percent of sound is absorbed.

The reverberation room, on the other hand, is constructed of concrete block, plastered to give a hard surface. The walls and ceiling are splayed to increase the diffusion of the sound field.

The uses of the anechoic room include the calibration of loud speakers, microphones and other acoustic devices, and measurement of the directional properties of acoustic devices.

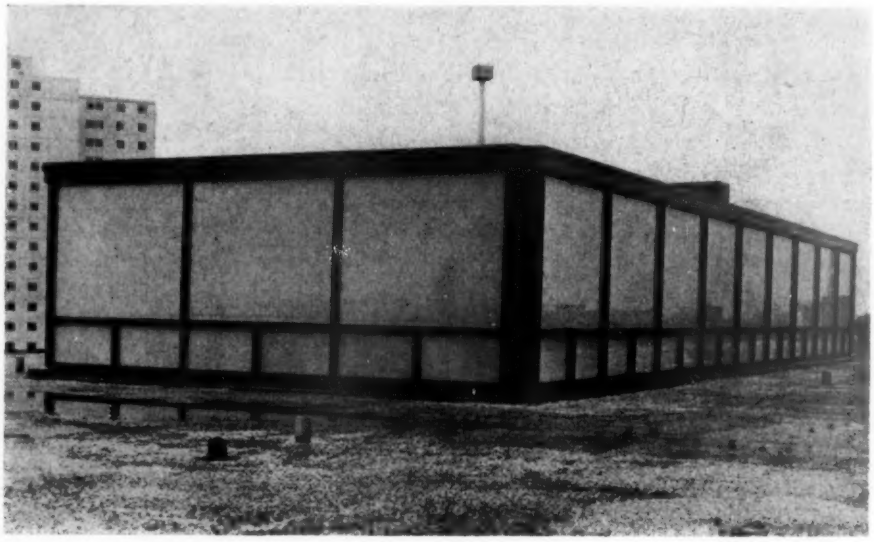
Investigations conducted in the reverberation room include measuring sound absorption properties of acoustical materials, simulating high noise levels, and integration of acoustical energy as a basis for computation of acoustical power.

The Electrical Engineering Research Department's computer center, installed on the fourth floor, is the most complete computer facility in the Middle West. Its equipment includes analog computers used to measure and predict the dynamic performance of physical systems, and a digital computer for statistical analysis of accounting and engineering data.

Foundation's Construction Program

The five projects in the Armour Research Foundation's program will enlarge and modernize the foundation's physical plant to make it one of the most complete industrial research centers in the world. Facilities, now scattered over some 15 buildings at Illinois Institute of Technology, will be concentrated in six buildings in a two-block area.

The two buildings yet to be constructed are a Chemistry Research Building and an Administration Building. The Mechanical Research Building is to be enlarged in addition to the expansion of the Metals Research Building. The present Engineering Research Building is the sixth building of the projected Armour Research Foundation group.



Atop the research building is an all wood and glass laboratory which provides the open space required for antenna research.

Photography by John Messina Studios

The Coliseum has unobtrusive lines which do not conflict with other campus architecture at SMU.

THE SMU COLISEUM— VERSATILITY AND VASTNESS

by GERALD McGEE

Assistant Director, Office of Information and University Publications, Southern Methodist University, Dallas, Texas

Mr. McGee was born in West Texas, but has lived in Dallas most of his life. He was on sea duty on destroyers for four years of World War II. After the war he studied at SMU (Class of 1950), majoring in English and journalism. Mr. McGee has served SMU in his present position since 1951. He is now at work on a first novel.

A FEW years ago Southern Methodist University's Athletic Department had a delightfully-serious population problem on its hands. More people were desirous of witnessing the SMU basketball team in action than the university's outmoded, 2,800-seat Perkins Gymnasium could accommodate.

Metropolitan Dallas, which SMU calls home, had begun burgeoning, years before this, into one of the fastest-growing population centers in the United States. The Athletic Department first felt the impact of this trend toward more people in the immediate post-World War II years with regard to football, traditionally the king of all spectator sports in the Southwest.

SMU's Ownby Stadium, which could hold some 25,000 football game spectators, quickly became much too small. This problem had an easy, ready-made solution. SMU simply transferred its home football games to Dallas' Cotton Bowl which in 1947, when the move was effected, seated about 35,000 persons. Two enlargements in the next few years more than doubled this capacity.

Today the stadium is sometimes referred to as The House That Doak Built. The allusion is, of course, to Doak Walker, SMU's sensational three-time All-American of that era, and helps to illustrate how well this

First stage of construction was the beginning of excavation in the fall of 1954. The arena was sunk ten feet below the ground level.

Second stage of construction, the structural steel skeleton is erected and the first vague outlines of the Coliseum become apparent. (Summer of 1955)

The finished product of steel, stone and brick is the culmination of several years of planning and two years of building.

Just before the first big event, workmen are putting the finishing fillips on the Coliseum's colorful interior by marking off the playing area in red and blue. Splendid facilities for press, radio and television are high off the playing court, to right of arena.

Lettermen's room in the Coliseum is comfortably furnished, complete with plenty of ash trays.

arrangement has worked out for both landlord and tenant. Not only that, but SMU now possesses one of the better practice fields in the nation—Ownby Stadium.

Even though Perkins Gymnasium could seat less than half of the SMU student body, in those days this amounted to only a simple, rather academic problem in arithmetic and constituted no real cause for dilemma. SMU had not been even a serious contender for the Southwest Conference basketball championship in well over a decade, and in that period had succeeded merely in arousing a modicum of sympathy and practically no other kind of emotion.

New Athletic Director Causes Changes

About this time, however, head football coach Madison (Matty) Bell was made athletic director, a new post at SMU, and he immediately set out to mold a well-rounded athletic program for the university. He molded so well that attendance to SMU home basketball games was soon put, almost literally, on a "by invitation only" basis.

Again, quickly, almost over-night, SMU needed a bigger place to play—basketball this time. And since there were no convenient Cotton Bowls accessible, this meant that the university would have to provide its own facilities.

Dallas residents and other persons on and around the SMU campus have become fairly blasé about spectacular construction. Not only was Dallas experiencing a population metamorphosis which was transforming the area into the unofficial cosmopolite capital of the Southwest, but the city's skyline was continually undergoing dramatic changes in shape, size, beauty and even color.

Everyone was building everything anywhere, for almost any conceivable purpose. Today Dallas is the largest city in the U.S. which is not situated on or near a navigable body of water. SMU, itself, a good-sized educational boom-town located on 150 acres of some of the most valuable land in Texas in suburban University Park six miles from downtown Dallas, had added 30 buildings costing more than $20,000,000 to its physical plant in the years following World War II.

But, from the first announcements that it was going to be built, everyone was excited about the SMU Coliseum. It was going to be more than a place for a university to run off some games of basketball. It was going to be big (and pioneers on any given frontier seem to prefer the large view), and its size was going to have beauty (still a marketable commodity) and, above all, usefulness. It was going to fill a need of the community.

The Structure Rises

Groundbreaking ceremonies were held for the Coliseum on November 5, 1954, with many of Dallas' leading citizens assembled for the occasion. Exactly two years later to the day, the first sporting event—a basketball game between Southwest Conference all-stars and the U.S. Olympic team, sharpening its skills for the impending Games in Melbourne, was held in the Coliseum before 6,300 enthusiastic fans who represented, at that time, the largest crowd ever to see a basketball game in Dallas.

Since the football season was still in full swing this

At SMU's June, 1957, commencement convocation, 5,000 persons saw 847 degrees awarded to class.

turnout was considered significant but was not surprising. SMU had won the Southwest Conference basketball championship of 1954–55, had repeated in 1955–56, was favored to do it again in 1956–57. Basketball interest in Dallas was quite understandably at possibly its highest pitch ever, and SMU didn't have much of a football team anyway.

The Coliseum had cost $2,500,000 to build and equip, but immediate indications were that it would have been a steal at twice the price. SMU did win its third straight basketball championship (a feat no other SWC team had accomplished in over a quarter-century), and attendance in the Coliseum was more than double that of the previous season in Perkins Gymnasium.

In the season of 1955–56, the last in the old gym, SMU played eleven home games before a total of 26,503 spectators (paid), for an average of 2,409 a game. In 1956–57, SMU's Mustangs played at home twelve times in the regular season to 64,471, an average of 5,372 per contest.

In the post-season Western Regional Play-Offs of the National Collegiate Athletic Association, four teams, SMU among them, played basketball on two successive nights before an average of 7,600 an evening.

Other Uses of the Coliseum

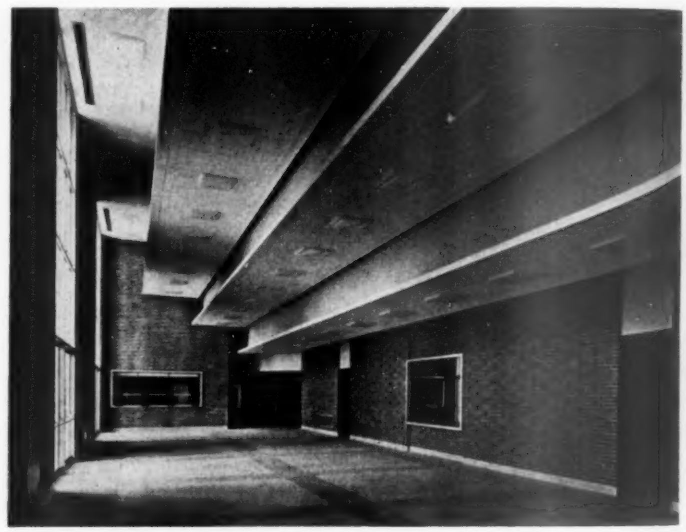
So SMU now had a good place to play basketball. But the point has been made that the Coliseum was designed to become more than a place to play basketball. And so it has. During its first few months of occupancy the structure had begun to fill a definite need of the athletic, civic, educational and religious organizations of the area. The building was designed by Smith and Mills of Dallas. General contractor was Robert E. McKee.

The value of the Coliseum to university functions in general was demonstrated at June commencement when 5,000 persons witnessed the awarding of degrees to a class of 847. The university also uses the Coliseum for registration purposes, a move which has facilitated this four-times-a-year procedure remarkably in both time saved and ease of operation.

Some Dallas area high schools hold their graduation exercises in the Coliseum and have used it on occasion for basketball games. Soon after the Coliseum's completion in August of 1956, a number of movie stars presented a show in it for the American Bar Association, which was having its annual convention in Dallas. Since then the Heart Association and other similar groups have sponsored entertainment in the building.

The largest tennis gathering in Texas' history congregated to see Pancho Gonzales, the United States professional tennis champion, beat Australia's Ken Rosewall in a match there.

At Easter, the Coliseum was the scene of televised services of the Highland Park Methodist Church, the



Lobby of the Coliseum, above, with ticket windows visible straight ahead. Below is one of the many comfortable and attractive offices. The entire building is air-conditioned.

Private office of the director of athletics.

world's largest Methodist church, which is located on the SMU campus. More than 8,000 persons attended the services, and all Sunday afternoon hundreds of others visited the Coliseum to view thousands of Easter lilies which had been used in the impressive rites. Religious leaders were somewhat surprised and quite delighted at how well and easily the Coliseum was adapted to the decorative scheme.

It is contemplated that as the years go by the Coliseum will be the scene of an increasing number of varied events. It has certainly been a busy enough first year.

Dimensions Are Impressive

The dimensions of the Coliseum are almost as impressive as its over-all versatility. Doak Walker himself could run for a 100-yard touchdown inside it and still have room to slow up, as its boundaries of 414 feet of length and 230 feet of breadth could easily encompass a football field.

Architecturally, the Coliseum adheres outside to the rather strict but quietly beautiful lines of Modern Georgian, the theme which is carried through all of SMU's buildings. Inside the Coliseum everything is, as they say in the trade, functional and contemporary (after all, basketball is new and is American).

The Coliseum is SMU's largest building in the number of square feet of ground area occupied and in the number of cubic feet contained (it has become necessary to qualify the Coliseum's vastness thusly, because several other SMU buildings actually have more square feet of floor space by the simple expedient of having several more stories).

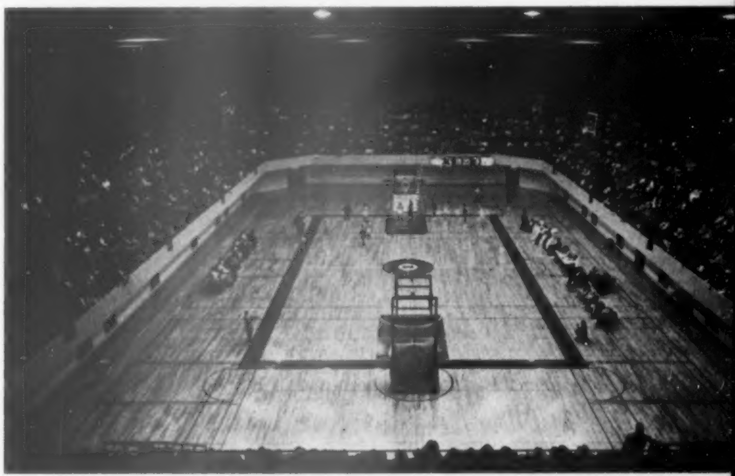
To the relief of many a patron (90-degree temperatures in January are not unknown in Dallas) the Coliseum is completely air-conditioned by equipment capable of generating 1,300 tons of refrigeration. Not that it was planned that way, but this could make going to a basketball game a thing of joy even if you don't like basketball.

The building can seat 9,000 persons at basketball contests, in comfortable, individual, permanent chairs with backs and arm rests, and can be modified to accommodate up to 12,000 when in use as an auditorium.

Large Playing Surface

The Coliseum's arena is sunk 10 feet below ground level and is large enough for three basketball games to be played on it simultaneously. This latter feature is particularly welcomed by SMU's Department of Physical Education for Men, which uses the immense playing floor to instruct students in volleyball, badminton, basketball and other sports. The large playing surface is also a boon to intramural athletics at the university.

Aside from its principal features—the actual playing area plus the spectator space ringing it—the Coliseum is a virtual catacomb of compartments for one use



First sporting event which took place in the Coliseum was a basketball game between the Southwest Conference All-Stars (light uniforms) and the U.S. Olympic Team (photo above). Coliseum also sees service as registration center for the university (below). Specially treated fabric covering protects the floor.

or another. Facilities for most of these activities had formerly been housed on a smaller scale in Perkins Gymnasium.

The Coliseum contains the university's physical education offices and classrooms and dressing rooms for men, intercollegiate athletic offices and dressing rooms, ticket offices and equipment rooms, offices and classrooms of SMU's Air Force ROTC unit, and a social room—the plushly rigged-out Lettermen's Room—where athletic heroes of bygone times can gather to ruminate and renew old acquaintances.

Gymnasium Becomes a Natatorium

One thing the university's administrators are quite proud of is the lack of waste connected with the move from Perkins Gymnasium to the Coliseum. For years SMU had been in need of a really first-class swimming pool. So after basketball moved out of the Perkins gym the hardwood court was removed (carefully, so that it could be put down elsewhere on the campus), and one of the better college pools in the country was forthwith sunk on the spot which had recorded many an historic dribble and crip shot.

With other minor alterations, Perkins Gymnasium was converted with relative ease into Perkins Natatorium (a precise new name has not yet been chosen), with already-installed seats for 2,600, plus fancy colored lighting for water shows and many other attractive features.

Quite a Campus

Naturally, just in case somebody might get the wrong idea, they always stand ready to tell you at SMU that there is a chapter of Phi Beta Kappa on campus too, as well as other distinctive scholastic assets, including a gigantic Univac Scientific computer which required a whole new building to house it and a brand-new Graduate Research Center which is quite the talk these days in SMU's part of the world.

All this, they tell you, *and* the SMU Coliseum, which is indeed, as one awestruck athlete phrased it so poetically, "quite a mess of bricks."

Old Perkins Gymnasium on the SMU campus was replaced in its initial functions by the Coliseum. It now contains an excellent swimming pool.

Rotunda

TRIPLE-PURPOSE FIELDHOUSE AT BRYN ATHYN

by CLARENCE S. THALHEIMER

Architect, Thalheimer and Weitz, Philadelphia, Pennsylvania

Clarence S. Thalheimer has been an architect in the Philadelphia area for over 33 years. He grew up in Philadelphia, and met his partner, David D. Weitz when they were still in high school. The firm is one of the largest in the Delaware Valley, and has been responsible for many of their city's biggest remodeling jobs of office buildings and department stores. In addition, Thalheimer and Weitz have designed many of the area's large shopping centers. Their current projects are broad in scope and include a hospital, shopping center, a high school and several banks.

DESIGNING a fieldhouse for the Academy of the New Church, Bryn Athyn, Pennsylvania, was a prime example of careful planning, plenty of research and economical building. A low, curved roof building on a grassy site in the rolling countryside of Pennsylvania, the Asplundh Fieldhouse was designed for a rigidly restricted budget. The result is a building which is low in cost, high in satisfaction. The structure was designed by Thalheimer and Weitz, architects of Philadelphia.

Lester Asplundh, after whose father the building was named, was chairman of the building committee and directed the entire project, assessing the problem and aiding in its solution. The goal was to build an all-purpose building, a combination gym, convention hall and recreation center.

The Academy of the New Church is the scene of many meetings and conventions of 2,600 people. Evening recreational facilities, including indoor roller skating for members of the church, was desired and additional gym space was sorely needed for the student body.

Research on Gymnasiums

After intensive research, which included visiting gymnasiums in private schools, public schools and colleges (even to inspecting a gym on the island of Hawaii), Mr. Asplundh discovered that a high proportion of existing gym facilities were both unattractive and inefficient. Many gyms resembled warehouses and, for economy's sake, had open roof trusses; dressing room facilities were located in a hole, and there was no separation for visiting and home teams. There seemed to be little beauty in the effort to make a gym functional. Walls were cluttered with apparatus; lighting consisted of the usual hanging exposed fixtures.

The Asplundh Fieldhouse, dedicated in October, 1957, is radically different from the standard gymnasium. The fieldhouse has a dramatic main hall, 150 feet long, by 100 feet wide, with seven polished laminated wood arches spanning the width, rising thirty feet above the floor, and containing 15,000 square feet of space. The hall is large enough for three basketball courts, official size, including one main court with a seating capacity of 500. Folding stands stack against the ,wall.

Structural Elements Are Hidden

No structural elements are visible and the effect created is not that of a gym. Only the attachment for basketball brackets acknowledges the fact that the hall is used for athletics. And the basketball supports were specially designed of tubular steel, consisting merely of

two supports and guy wires so that they would be as unobtrusive as possible.

On either side of the main hall is space 30 feet wide by 150 feet long. On one side this space is utilized for a wrestling room, kitchen and serving area to accommodate 1,800 people. The wrestling room can also be used for serving small banquets. On the other side the space is divided into dressing and toilet rooms, and office space for the coaches.

Wood Makes the Difference

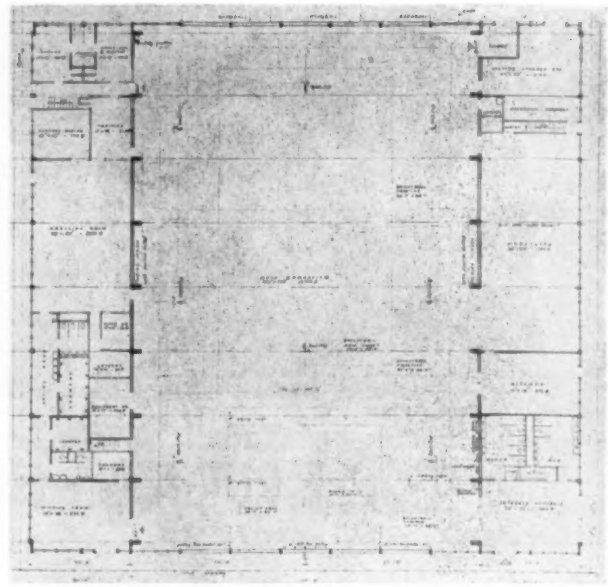
Constructed cost for the building was $13.30 per square foot. How was this accomplished? Basic construction of the building is wood, including window frames. Since the academy employs a full time maintenance crew to service the building, the vast differential between wood and other materials made the wood most feasible.

The exterior is a specially selected concrete block, of warm grey, purposely left unpainted but completely waterproofed. The two end bays are glass from ceiling to floor, all tempered safety glass for added strength, and at the lower levels, ¾″ thick.

Inside, the concrete block is painted a soft blue on one side, green on the other; the ends are a bright terra cotta. The arch frames give the hall its finished look and individual character. Each frame is four feet deep and eleven inches thick at the point of most stress.

Strong Acoustical Ceiling

Doors on either side are of flush natural birch. An unusual feature is a ceiling of one-inch-thick wood fiber insulating material, which conceals the structural roofing. A ceiling was desired with some acoustical properties, yet strong enough to withstand gym use. Each panel is self-supporting in case it should be hit; yet, it is strong enough to span between supports.

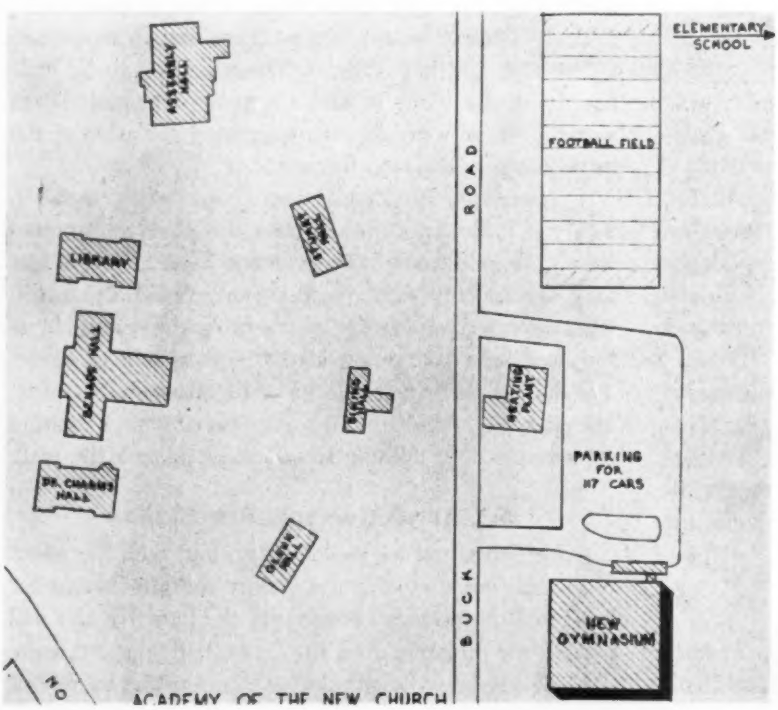


On the first floor auxiliary areas are located around the main gym.

Three kinds of lighting are provided in the all-purpose room, each serving a special function. Each hanging light is partially recessed into the ceiling, and the exposed section is covered with a specially designed steel collar finished in white.

On both sides of the gym, indirect light frames are painted blue and green to match the walls. When the students have dances and soft light is desired, colored filters can be inserted, reflecting a variety of colors on the white ceiling.

At one end of the hall which will be used as a stage,



Campus plan of the Academy of the New Church, Bryn Athyn, Pennsylvania. The new fieldhouse is located at the lower right of the plan, next to a parking field for 117 cars.

The gym interior is featured by the wooden arch frames, each 4 feet deep at point of most stress.

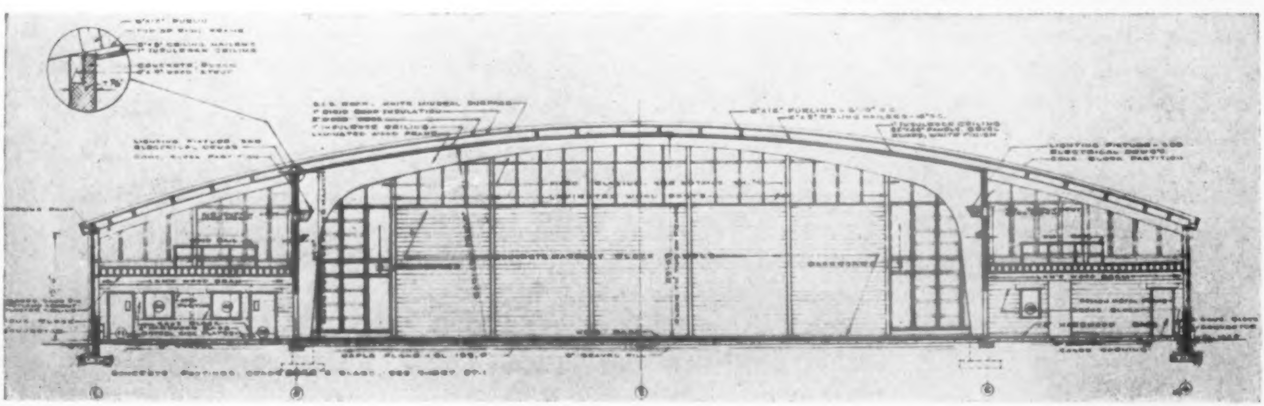
adjustable bullet spotlights are attached to one of the main beams. The wood floor has been protected with a special commercial product which gives an impenetrable hard surface, so that the floor can be used for indoor roller skating.

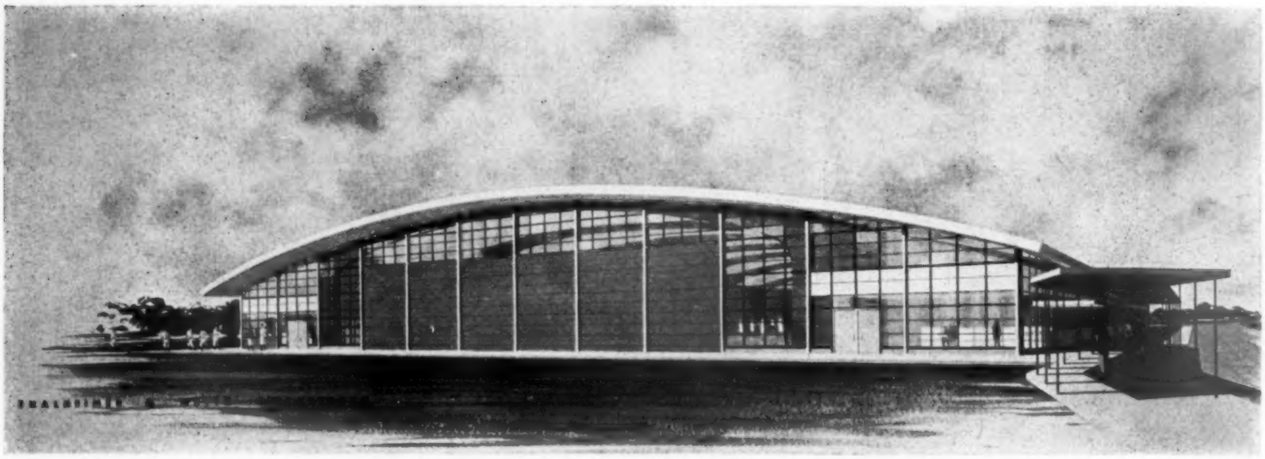
A main boiler house located elsewhere on the campus provides the heat, piped to the fieldhouse. Sixteen heating and ventilating units blow warm air into the main hall, and can be used for ventilating during the summer. Auxiliary rooms on either side have radiators.

Efficient Dressing Rooms

Probably the most efficient use of space is the design of the dressing rooms. There is a large dressing room and toilet room, for the home team during competitions and for general athletics, which is finished in grey ceramic tile. Walls are painted yellow and orange. Adjoining this is a small room to be used by an individ-

Concrete masonry block forms a portion of the wall structure, with glazing and laminated wood posts.





Designed by architects Thalheimer and Weitz of Philadelphia, the fieldhouse for the Academy of the New Church serves as a gym for the student body, as a place for evening recreational facilities for church members, and as a meeting and convention hall for large gatherings.

ual gym class or visiting team. A locker room is next to the dressing room, and can be closed off when visiting teams arrive. Concept of design was that all dressing facilities can be used together if desired, or separated if necessary.

The main arch of the building was flattened to provide mezzanine storage space, and each side gives usable space of 30 feet by 150 feet. Since Bryn Athyn is a church center, recording equipment to tape banquets and sermons, and storage for athletic equipment and the church's publications, were important elements of the plan.

Parking for 200 Cars

The main entrance is covered by a free-standing canopy, and there is available parking for 200 cars. Selection of this particular site on the campus allows for future expansion of the school on twenty acres, with the planned erection of regulation football and baseball fields and handball courts in the front of the section.

The entire character of the outside contributes to making the building an integral part of its setting. A white mineral surface roof, natural concrete block and the white wood trim, creates simple modern design which fits in with buildings designed in other areas.

Some of the previous buildings on the academy's campus were built as far back as 1898. From time to time other structures have been added as additional facilities were needed.

Close Attention to Details

The success of this building—not only in terms of price, but in its varied use—comes from close attention to the smallest detail. In considering the most minute problem as a major one, it has been possible to create a building which can ably perform its three-fold function—gym, recreation center, and convention hall—and serve well in each capacity.

Divergent elements of 13th century Gothic and 20th century modern architecture act as foils for each other in the exterior design of the new Dining Hall at Rosemont College. Gleeson & Mulrooney are the architects.

Thomas C. Walsh

DINING HALL AT ROSEMONT COLLEGE

by RAYMOND T. GLEESON

Architect, Gleeson & Mulrooney, Philadelphia, Pennsylvania

Mr. Gleeson is a graduate of the University of Pennsylvania and has been a practicing architect in Philadelphia since 1924. During this period his firm has designed over 500 buildings in Pennsylvania, New Jersey, Delaware, Maryland and Virginia. The buildings have been all types of educational, institutional, religious and commercial structures. The firm has been designing campus buildings for Rosemont College for the past five years.

THE latest building to be erected in the postwar expansion program at Rosemont College, Rosemont, Pennsylvania, is the new Dining Hall. In recent years there have been erected the Science Building, with its attached McShain Auditorium, and a large addition to the small library. At the planning stage now are new dormitories; and these will complete the present building program.

The campus of Rosemont is situated on a former estate in a choice section of Philadelphia's Main Line. It is rolling and wooded country. The center of the campus is the original Sinnott Mansion built in the style of the French chateaux in the valley of the river Loire. This building now is used as a faculty residence and administration building. It is situated on the highest hill of the college property.

Attractive Campus Grouping

All other buildings are generally arranged in a circle around the administration building. It makes for a most attractive and interesting grouping of buildings with pleasant views in all directions.

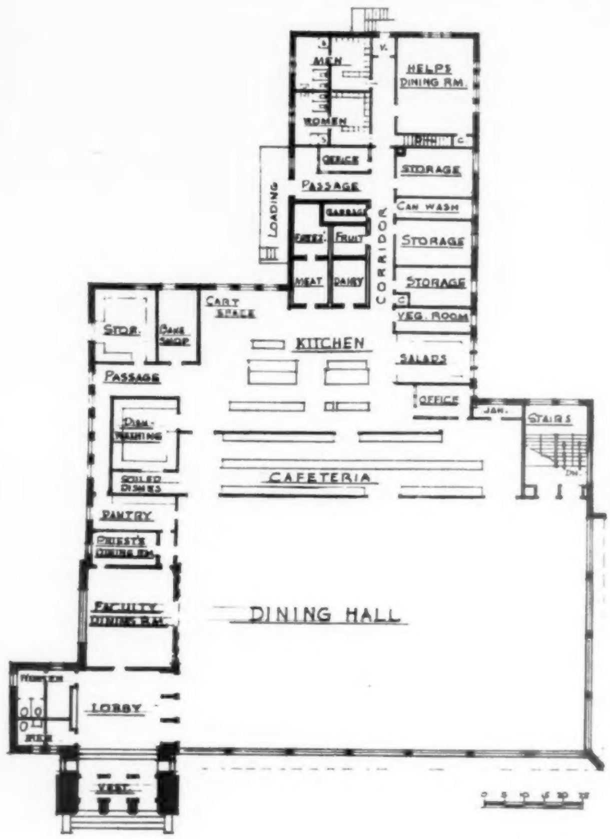
Exterior Design of the Hall

The basic problem of the exterior design of the Dining Hall was this: It was desired to have the main dining room in the best contemporary fashion, looking out upon views of the campus from a continuous series of picture windows to bring the sense of the outdoors into the room. Yet all other buildings are designed in the English Collegiate Gothic style with heavy stone piers and small windows, and the college planners wished to hold somewhat to this style.

What seemed a basic conflict was resolved by meeting the issue head on. The 13th century Gothic architecture was used at the main triple doorway. This abuts the modern 20th century all glass façade of the Dining Hall, and the aesthetic result is quite satisfactory. Rather than conflicting with one another, these divergent elements act as foils for each other. The stone

The lobby-lounge leads to the faculty dining room, straight ahead, and the main dining hall at right.

First floor plan of the Dining Hall. Folding doors separate the faculty dining room from the main hall. The cafeteria serving line is apart from the main area.



A considerable amount of the kitchen equipment had to be reused from another building. The area was carefully planned for the new and old facilities (below).

work is of Foxcroft stone with Indiana limestone trim.

Overhanging the windows is a concrete sunshade projecting out four feet. This feature admits desirable winter sun and excludes the objectionable summer sun, and also prevents ordinary rainstorms from staining the windows. A further modern touch is a stone fin placed at the angle where the two picture window walls meet. The fin is not only a decorative element, but also strengthens and supports the concrete sunshade.

Details of Construction

The floor construction between the main floor and the basement is reinforced concrete beam and slab. The roof construction is steel joist with a steel deck and insulation above this of light-weight vermiculite insulating concrete.

Students enter the building at the basement level where the main cloakrooms and toilet facilities are located. They proceed up an ample and well lighted monumental staircase to the dining room. Here, the two windows are ten feet wide and eighteen feet high, running from floor to ceiling. The main dining room is 67 feet wide by 103 feet long and is unobstructed by any columns.

The ceiling is composed of acoustical plaster and has flush lighting fixtures. Walls are finished with Lamidall, a plastic covered rigid board in a simulated light birch finish. The floor is terrazzo in a simple striped design of light and dark green.

At one end is a faculty dining room, 21 feet by 27 feet. This room is separated from the main room by a folding partition. Thus a double purpose is served, on nights when the main room is used for college dances, the orchestra is placed in the daytime faculty dining room.

Serving the Meals

Breakfast and luncheon meals are served cafeteria style and the evening meal has waitress service. This plan required a cafeteria service counter which is sepa-

Thomas C. Walsh Photos

Cafeteria serving counter is 65 feet long. It is divided into two sections, each complete and identical in service, to prevent long queues and to expedite the serving of meals.

rated from the main room by a screening partition. The service counter, 65 feet long, is divided into two complete and identical service sections in order to prevent long queues and to expedite service.

In addition to the main function of the building for college and faculty dining, there are two other purposes served. Off the rear of the main kitchen are the dining room for the help and attendant locker and toilet rooms. In the basement, under this section, is the college laundry.

Planning the Kitchen

The kitchen equipment layout was studied for one year before the architectural plans were begun. Participating were the Mothers of the Holy Child who conduct Rosemont College, the kitchen engineers, Wm. F.

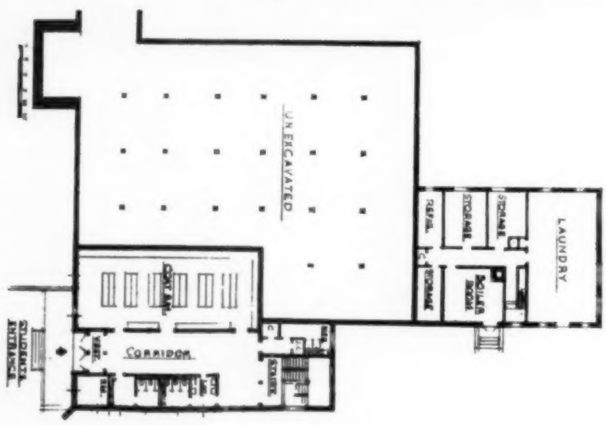
Main dining hall has an acoustical plaster ceiling and flush lighting fixtures. Round and square tables are used to vary the appearance of the room. Room measures 67′ by 103′, unobstructed by any columns.

Dougherty & Co., and the architects, Gleeson & Mulrooney. Much care was necessary in planning the layout to accommodate a considerable amount of kitchen equipment to be reused from the old smaller kitchen in another building. Some older items were enlarged to meet the new requirements.

Within the kitchen there is a separate alcove for salad preparation, 13 feet by 20 feet in size. The potato preparation room is 11 feet by 20 feet. A separate room is provided for can washing with high pressure steam. The refrigerating machinery is placed in the basement directly under the areas it services.

The dishwashing alcove is ingeniously arranged with a corridor baffle that keeps all clatter of dishes

The students' entrance to the building and storage areas are at the basement level.

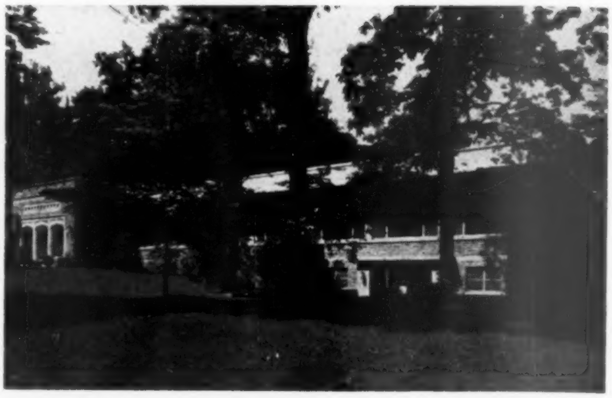


from being heard in the dining room. There is a separate bake shop, 11 feet by 21 feet.

Since the evening meal is served in food carts, two floor areas in the kitchen are reserved for storing the carts when they are not in use during the day.

Walk-In Freezer Compartments

There are five separate walk-in freezer compartments; one for meats, one for dairy products, one for vegetables, one deep freeze and the fifth for temporary storage of garbage which accumulates until it can be carried away by truck. This room is ventilated to the outside by an areaway with a grating at grade.



Students regard Rosemont College's new Dining Hall as a welcome campus addition.

The floor of the kitchen is quarry tile and the walls are glazed structural facing tile. Food is delivered at a loading platform at the first floor level. Nonperishable food is then lowered in an electric dumbwaiter to large storage rooms in the basement and perishable food is put in the walk-in freezers.

Elaborate Ventilation System

There is an elaborate system of ventilation for both the kitchen and dining room. In the dining room there are four large grilles at the ceiling near the entrances to the cafeteria counter. These are of low velocity and discharge on the roof.

Scattered at strategic points around the kitchen are ten smaller motorized exhaust fans that discharge on the roof. Supplying fresh air to these areas is a system of ducts and fans that draws air through a louver, 9 feet by 3 feet in size, placed in the basement wall.

Building Is a Success

The new Dining Hall at Rosemont College is generally regarded as a success by the two groups most concerned—the chefs who use the kitchen and the college students who use the dining room. It may be concluded, therefore, that the building is highly functional as well as aesthetically handsome. The builder was John McShain, Inc. and the architects were Gleeson & Mulrooney of Philadelphia.

Photos by Frank Lotz Miller

Designed by architects Burk, LeBreton and Lamantia of New Orleans, the Student Union is composed of three separate, coordinate units.

MEMORIAL STUDENT UNION AIDS GRACIOUS LIVING

by JOS. A. RIEHL

Dean, Southwestern Louisiana Institute, Lafayette, Louisiana

Dean Riehl is a graduate of Southwestern Louisiana Institute and of Georgetown University's Foreign Service School. He has been on the Southwestern staff since 1933, and has served as assistant professor, associate professor, professor of History, dean of men, registrar, dean of the College of Liberal Arts and dean of the College. During World War II he was in charge of the college's Navy V-12 Training Program.

SOUTHWESTERN Louisiana Institute's Memorial Student Union is situated in the center of a spacious campus, and borders a small cypress lake. The building was first occupied at the beginning of the fall semester during the 1956–57 academic year. The structure is an outgrowth of a long-felt, dire student need and painstaking planning by college officials under the driving leadership of President Joel L. Fletcher.

The Student Union was the first large scale project authorized under the provisions of Act 619 of the 1954 Louisiana Legislature. This law provides for the issuance of long-term, tax-exempt bonds, payable from the revenues of designated income producing facilities and student fees assessed for such purposes.

Southwestern Louisiana Institute was founded in 1898 by legislative act, and is the largest of the state supported colleges under the jurisdiction of the Louisiana State Board of Education (1956–57 enrollment, 4,562). It is located at Lafayette, Louisiana, on the

Olivier Hall has three stories and is protected from the street by reduced window areas and sun louvers. It is open to the lake front.

banks of the Vermilion River in the heart of the fabled Evangeline country.

The institute lies some 40 miles north of the Gulf of Mexico and 150 miles west of New Orleans in one of the most densely populated and highly productive agricultural areas in the state. Recently, extensive local and off-shore oil exploration and development have caused rapid and widespread commercial and industrial growth in the area served by the college.

A Community With Background

In addition to being a growing educational, commercial, oil and agricultural center, Lafayette is noted for its beauty and the charm and graciousness of its people. Its natives are descendants of the Acadians and many of them still speak French as well as English. The area's rich historical, bilingual background has resulted in a unique local appeal, which is enhanced by beautiful surroundings. The Southwestern campus, in the middle of the city, is noted far and wide for its profusion of live oaks, native irises, roses, azaleas and camellias.

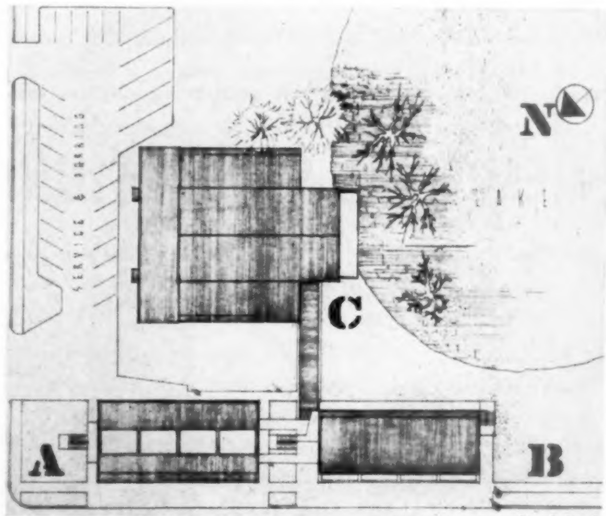
A large percentage of the college's students live in Lafayette and adjacent parishes (counties), within easy driving distance of the campus. This fact, to a certain degree, influenced the plan and location of the Memorial Student Union. The architects, Burk, LeBreton and Lamantia of New Orleans, gave adequate weight to such factors in designing the project.

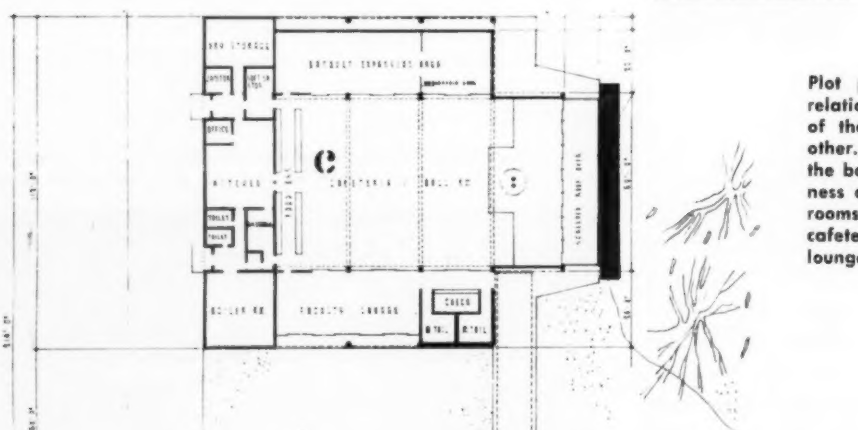
In order to care for the needs and comforts of the commuting or drive-in students, as well as the on-campus residents, consideration was given to the preparation of facilities for them. The commuters leave their homes often before daybreak and remain on the campus until late afternoon. Provision was made for these persons in the men's and women's lounges where, among other features, rest quarters and a large reading room are available.

Required Areas of the Structure

The overall plan of the building included a college bookstore and postoffice, offices for student government and student publications, faculty apartments, and a coffee shop that would supplement the food services of the college dining hall and provide ballroom and banquet space.

Because of the variety of planned uses and in consideration of accessibility and functional factors, it was decided to divide the Student Union into three sepa-





Plot plan, above, shows the relationship of the three units of the Student Union to each other. Unit A, see left, houses the bookstore and various business offices; Unit B has lounge rooms; and Unit C includes the cafeteria, kitchen and faculty lounge.

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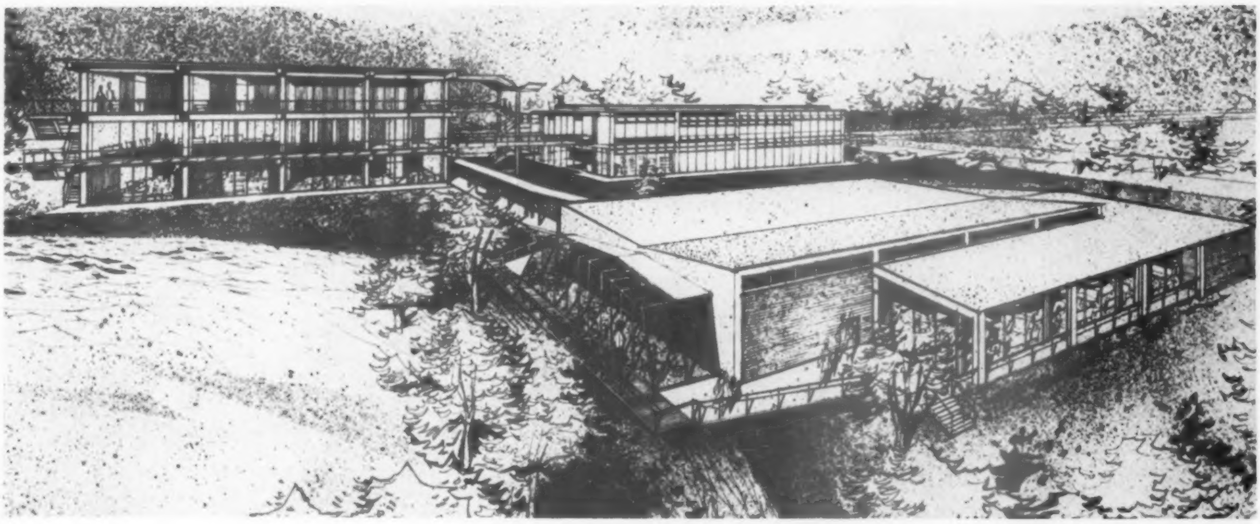
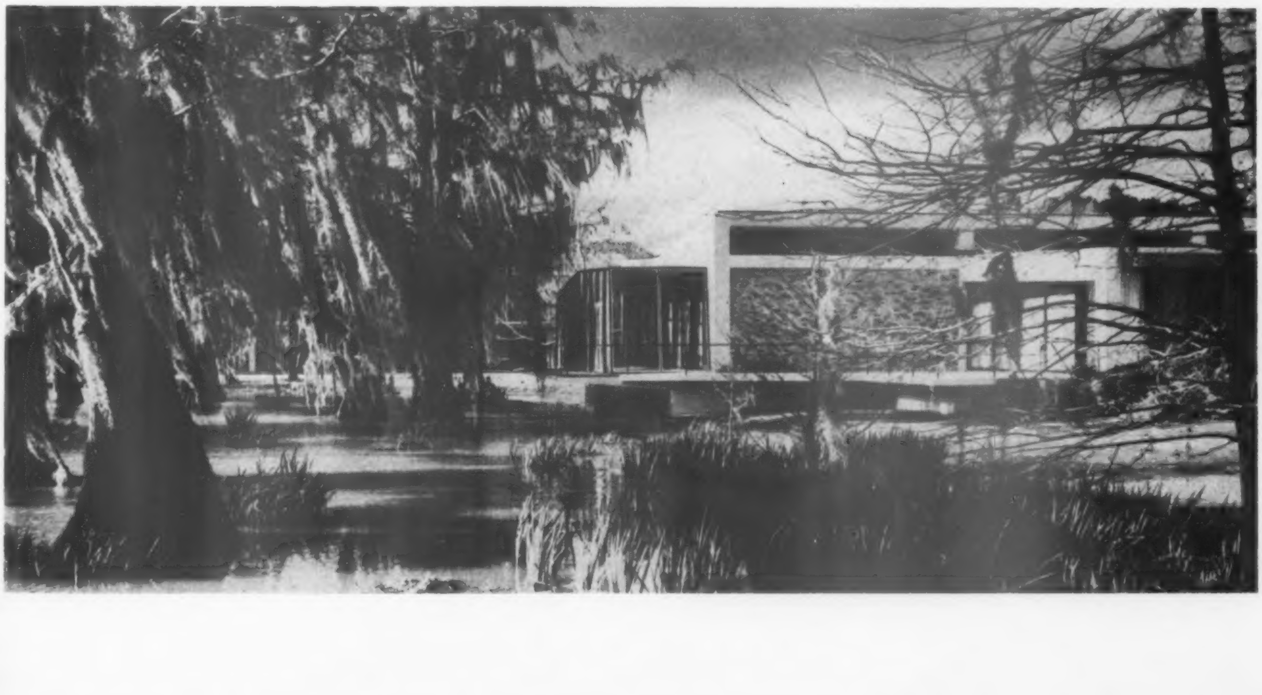
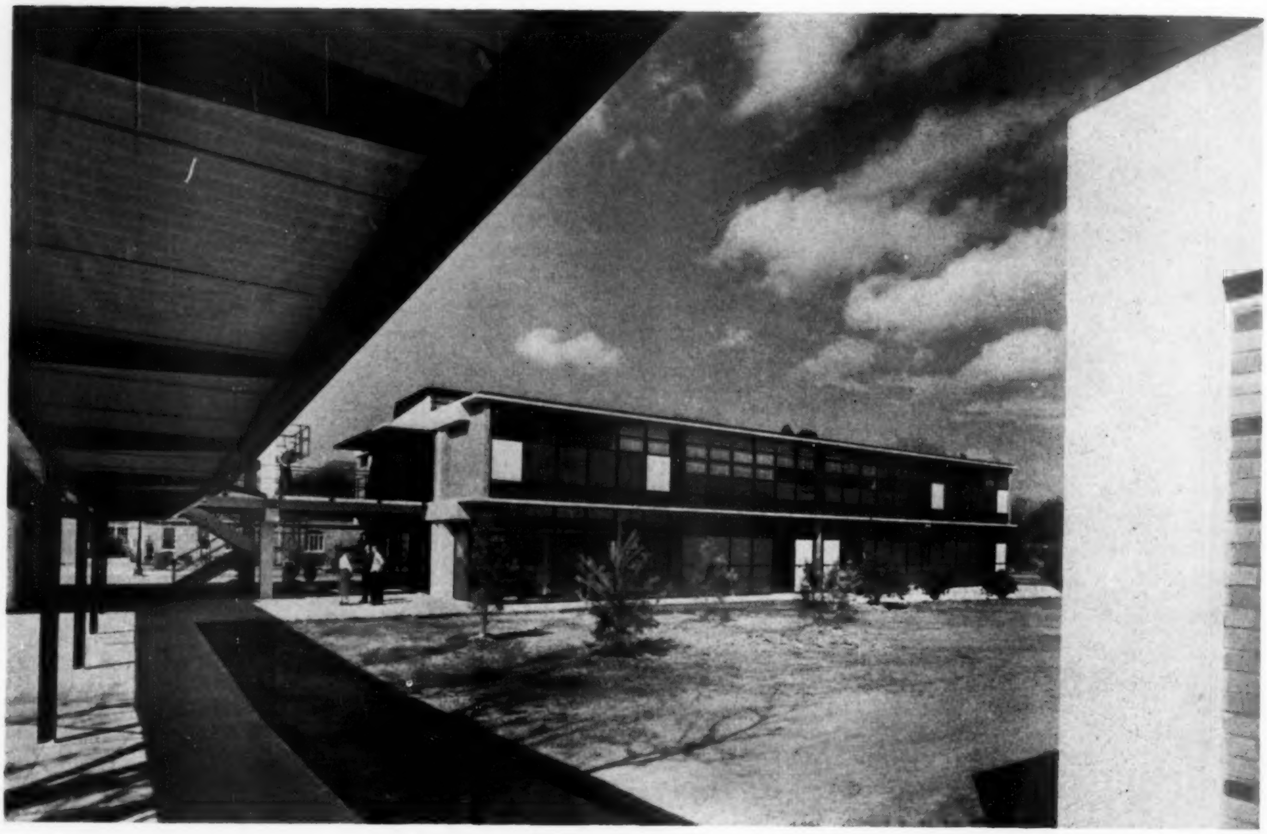


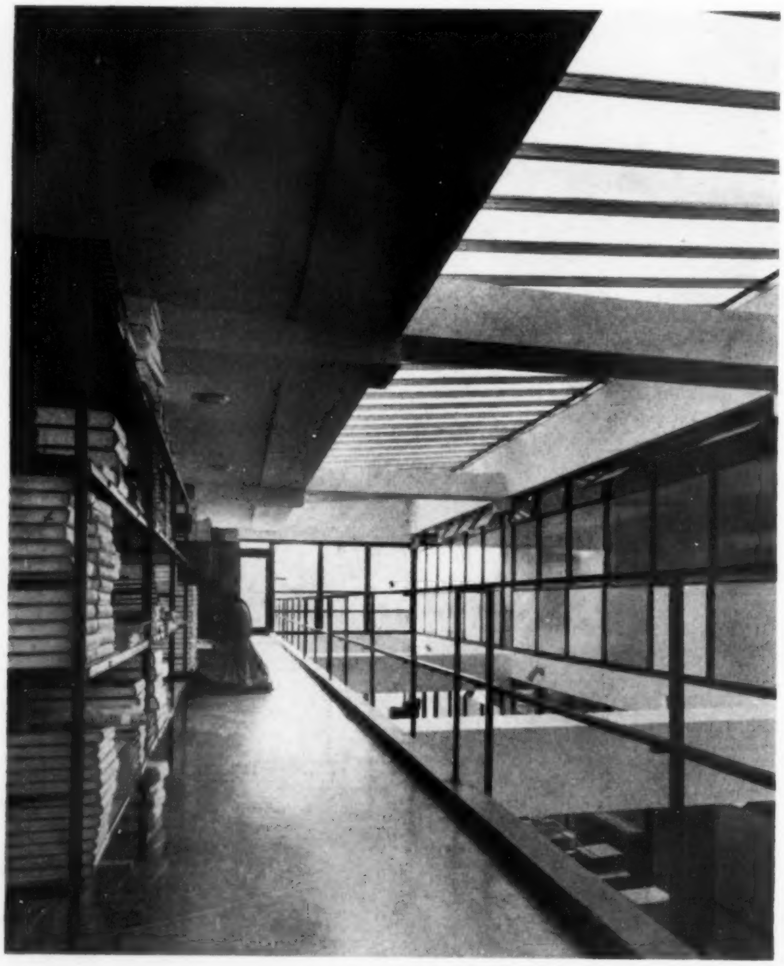
Campus of Southwestern Louisiana Institute is noted for its profusion of live oaks, native irises, roses, azaleas and camellias. This abundant growth provides a beautiful native background for the new Student Union.

Guillory Hall is a ballroom-banquet hall combination in a one story building. The interior can be subdivided into three small individual areas or it can be used as a whole. One end of the hall is cantilevered over the lake (below).





Coronna Hall houses a bookstore and postoffice on the ground floor and student government and publications offices on the second floor.



The college bookstore occupies the major portion of Coronna Hall, on two levels. A maximum of window area provides daylight for the interior.

rate but coordinate units. The three are united by a sculptural grouping in reinforced concrete of stairs, balconies and a covered walk. This scheme allows a decentralization of building masses, while at the same time it maintains the charm and beauty of the lake site.

Coronna Hall, the Business Unit

Unit A, or Coronna Hall, is located on the corner of a busy boulevard. It is a two-storied building and houses a bookstore and postoffice on the ground level and student government and student publications offices on the second floor. The building is commercial in nature and was located to allow the greatest visibility of its wares as well as easy accessibility from the heavily trafficked avenue. It can be operated independently from the other two buildings of the group, is easily serviced and is insulated by space so that the commercial din does not disturb users of the other units.

Olivier Hall Has Quiet Atmosphere

Unit B, or Olivier Hall, is a three-storied building. It is joined to Coronna Hall by stairways and a balcony, and requires a much quieter atmosphere than the other two units. It is protected from the street by reduced window areas and sun louvers, and is completely open to the lake front by means of sliding glass walls which open onto wide, long balconies.

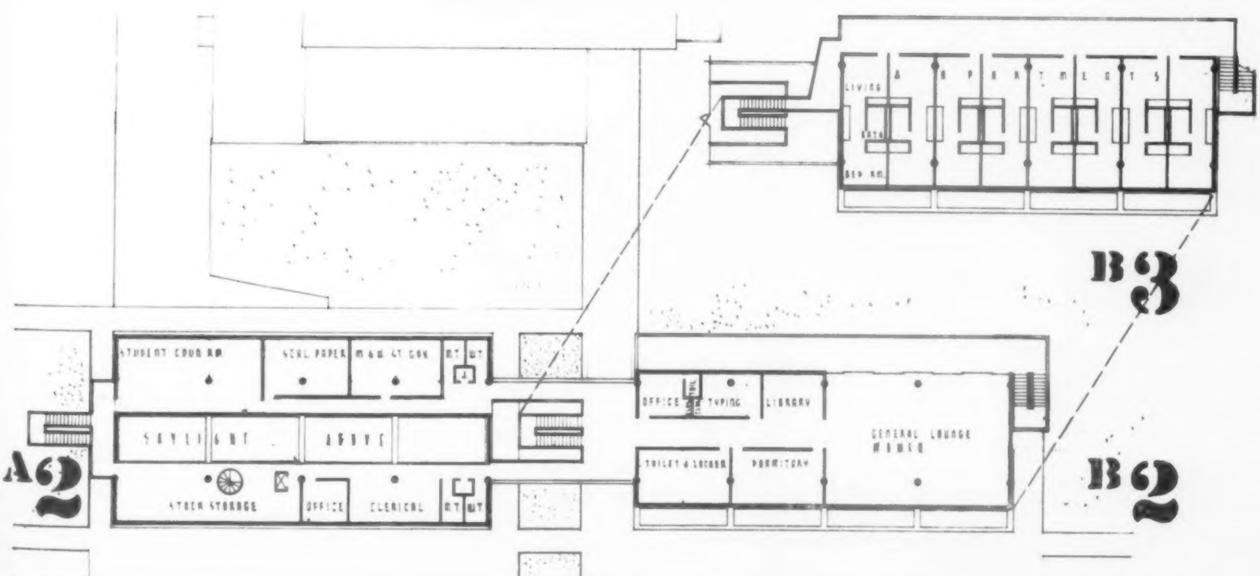
The first and second floors are dedicated to study lounges for men and women, respectively. Toilet and locker room facilities, offices for proctors, acoustically treated rooms for typing, sleeping rooms, and large study and reading lounges feature this area. The third level contains eight efficiency apartments for the faculty. These apartments are completely equipped for single or double occupancy.

The Ballroom-Banquet Unit

Unit C, or Guillory Hall, is a ballroom-banquet hall combination in a one-storied building, with a kitchen, lounges, storage and refrigeration areas, and other necessary adjuncts. It can be subdivided into three small individual areas; or it can be used as a

Sliding glass walls at all three levels open Olivier Hall to the lake front. There are long, wide balconies at each level. Stairways and a balcony join Olivier Hall to Coronna Hall.

Second floor of Unit A has student government offices, storage area and clerical rooms. Second floor of Unit B includes the women's lounge, dormitory and library. Third floor of Unit B has faculty apartments.



The three buildings of Memorial Student Union are framed in reinforced concrete, resting on concrete bell bottomed piling. All three are united by a sculptural grouping in reinforced concrete of stairs, balconies and a covered walk.

whole, offering comfortable banquet space for 500 or accommodating 800 at a dance.

The hall was located and designed for typical college social events, and the cantilevered end over the lake has few limits to its possibilities as a lounge or for parties. This building, while serving formal functions on occasion, is a general recreation area and snack lounge most of the time. It is a popular and busy gathering point for students who have no special assignments for their free time.

The three buildings which constitute the Memorial Student Union are framed in reinforced concrete and rest on concrete bell bottomed piling. Exterior walls are principally window area, with masonry filling in where closures are desirable. The masonry skin is quarry tile on Units A and B and brick on Unit C. Interior partitions are plastered and ceilings are acoustic plaster. Floors are terrazzo, but some asphalt tile was used in the faculty apartments.

Heating was arranged in such a manner that each building can be operated independently. Building C employs radiant heat while the other two are serviced with warm air. Electrical work is conventional. Carefully selected standard fixtures were used to produce the desired results.

Bids were received for the buildings and furniture in July, 1955. The project was completed in a year, at a cost of $630,117, and was furnished for $39,920.

Selling the Revenue Bonds

Barksdale and LeBlanc, of Baton Rouge, Louisiana, were the general contractors. The revenue bonds were sold to College and University Finance Associates, of San Antonio, Texas, by negotiation. Joseph A. Riehl, Dean of the College, and W. Frank Owen, Business Manager, represented the college in arranging financial details of the bond issue and during the period of construction.

RESEARCH REPORT 14

FORM *ALLOWS* FUNCTION

by THOMAS A. BULLOCK
HERBERT PASEUR

"WE see Tomorrow's School as having the timeless quality—a certain dynamics—which allows it to be adapted to any educational program, any age group, any designated period of learning. This must be because education, like the American way of life, is ever changing, never static. . . ." (From *The School Executive*, "School of Tomorrow," February, 1957.)

Buildings with Functional Thrombosis

Few buildings of the past, including schools, have the ability to cope with the fast pace of changing functions. In every community in the country there are structures being demolished—structures that are physically sound but functionally useless. This premature end of the usefulness of a structure is unfortunate in any building type, but extremely so in schools where the shortage of educational dollars is becoming more acute each day.

If we examine the circumstances of the period in which these buildings were designed, perhaps we can determine the causes that led to the situation that exists today and, at the same time, gain an insight into the future.

Function-Follows-Form Approach

Architecture of the not too distant past was dominated mostly by revival of the classic styles of Greek, Roman and Gothic. In accepting a commission an architect had only to decide in what style a building should be designed. The function of the building was of little

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For Research Reports 1, 2 and 3 consult *American School and University* 1954-55, pp. 433–448.
For Research Reports 4, 5, 6 and 7 consult *American School and University* 1955–56, pp. 409–436.
For Research Reports 8, 9 and 10 consult *American School and University* 1956–57, pp. 433–448.
For Research Reports 11, 12 and 13 consult *American School and University* 1957–58, pp. 367–388.

THE PROBLEM:

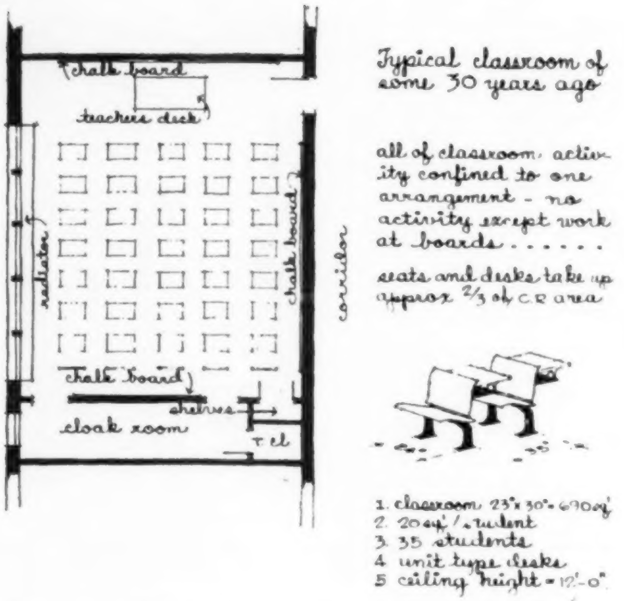
Architectural approach has progressed from the classic styles of Greek, Roman and Gothic, in which "Function-Follows-Form," to the "Form-Follows-Function" theory. This guiding principle has resulted in buildings with utility value as well as artistic style.

But what happens when functions change? Must we resort to scrapping old buildings and starting anew? Obviously, for financial and practical reasons such a drastic step should be avoided at all costs. The answer is an appraisal of our basic architectural philosophy in terms of "Form-Allowing-Function."

Norman, Oklahoma, High School is an example of the Form Allows Function approach.

Hedrich-Blessing

CAUDILL • ROWLETT • SCOTT
ARCHITECTS
BRYAN, TEXAS, CORNING, NEW YORK
OKLAHOMA CITY, OKLAHOMA



While adequately designed for the educational program of its day, this classroom did not have the qualities of economical flexibility to serve subsequent changes in educational philosophy.

consequence because the exterior appearance was considered all important. It was assumed that the function of the building could be adjusted to any form chosen.

This theory, which could well be termed a "Function-Follows-Form" approach, led to some unusual combinations—railroad stations that looked like Roman baths, office buildings with the appearance of elongated Gothic cathedrals, service stations in the Byzantine style.

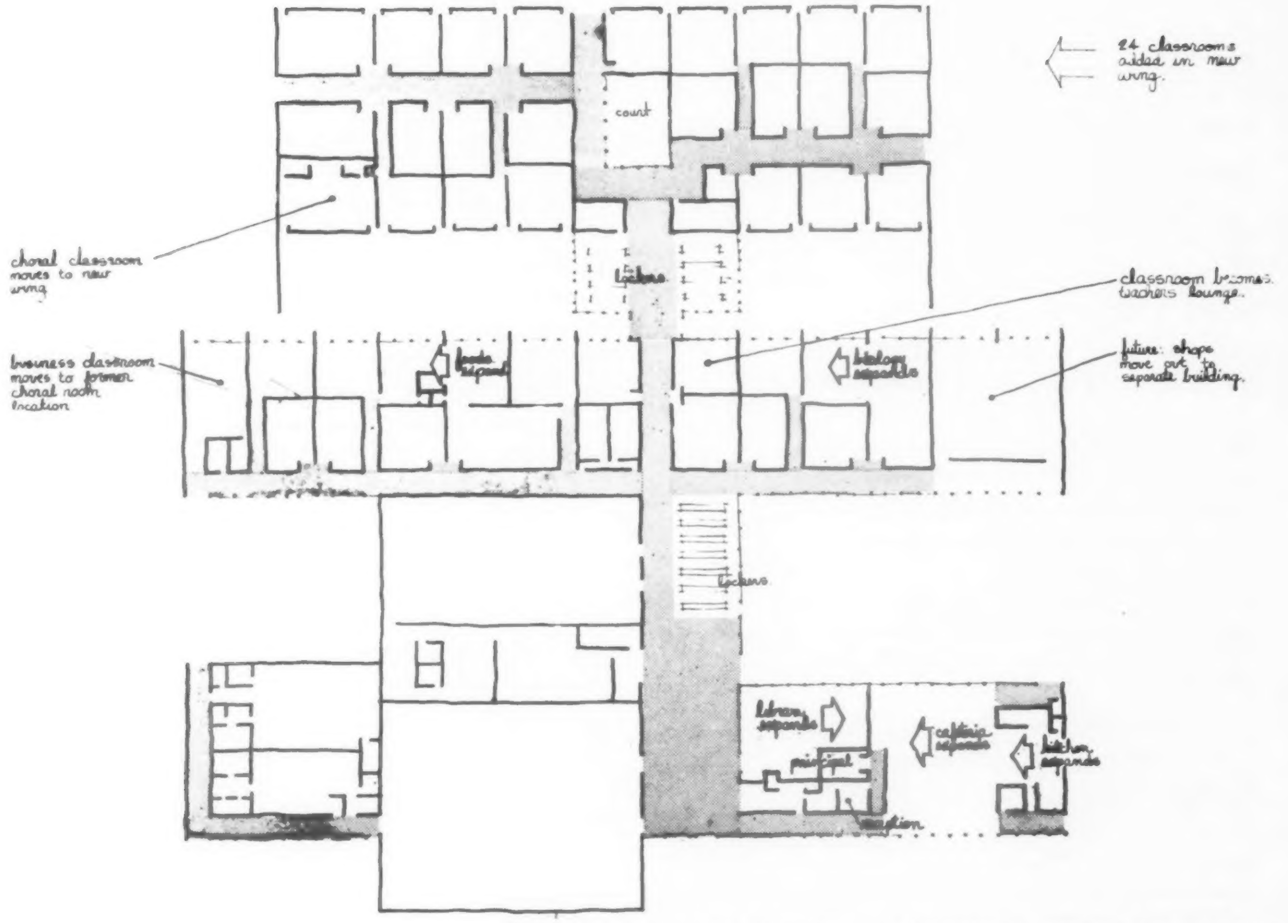
About 1900 this idea of copying outdated forms to house the functions of an age of technology was rejected by a small group of architects. They felt that, with the advance of technology, new forms could be developed that would better accommodate the new activities, creating a different spirit of architecture. The slogan of this group was "Form-Follows-Function," a term we are all familiar with today. This phrase simply meant that a building should be planned for its intended use and that the architectural form of the building should be molded by that use.

Form-Follows-Function Theory

Form-Follows-Function was a very radical and new approach to architecture—a complete about face to the generally accepted method of that day. Moreover, this idea gained acceptance only after many years of persistent evangelism. But now that Form-Follows-Function has accomplished its main objective of freeing architecture from classic styles, perhaps we should re-evaluate the phrase and try to give it new meaning for the future.

The Form-Follows-Function theory overlooked one basic point—changing functions. People's habits change, industrial processes change, educational philosophies change, merchandising techniques change. Buildings must be able to adapt to these changes or they will be

BEFORE. This is the floor plan of the Norman Senior High School as originally designed for 600 students. Salient consideration in the design called for school to be expandable and for its teaching areas to be adaptable to changes in educational philosophy and program.



AFTER. Here is floor plan of the same school showing the addition of a new wing of classrooms and expansion of specialized areas in the original building. The school now has twice the original student capacity. The addition and conversion were made economically and efficiently without marring school's beauty.

discarded along with the original functions for which they were designed. This one point, we feel, is responsible for countless wasted building dollars, in terms of structures not being useful over their entire physical life span, either by demolishing or expensive renovation.

The Old Classroom Cell

An obvious example of the Form-Follows-Function approach (in past school planning) is the standard 22′ x 30′ classroom of some years ago. This 22′ x 30′ space for housing 32 children was considered ideal now and forever, for all classroom educational space. The classrooms had, on one exterior wall, a certain number of windows for ventilation and light, so many linear feet of chalkboard; in fact, every detail was worked out beautifully for the function of that day. In many states legislatures even enacted this classroom into the state laws to insure "high quality" school planning. But, one point was overlooked—future change, particularly in educational function.

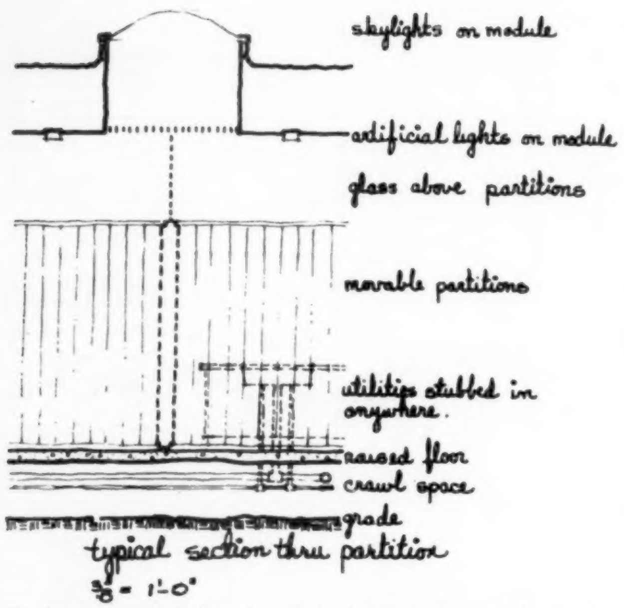
1960 Function—1900 Form

Some of the recent educational developments that made this classroom inadequate are easy to point out—teaching aids increased, teacher-student ratio changed, movable furniture was introduced, curriculum expanded, outdoor teaching, student projects, group teaching.

Of course, this type of classroom has made a valiant but vain attempt to adapt to the changes. Seats have been unfastened from the floor, chalkboards and storage have been added, cloakrooms have been converted to storage and project areas, but still the inevitable end is apparent. The space just does not have the qualities of flexibility that will serve a dynamic educational philosophy.

Form-Allows-Function

With these shortcomings in mind, instead of Form-Follows-Function, it is necessary to think in terms of Form-ALLOWS-Function—a planning system *allowing* many future and unknown changes. It is difficult to successfully resist a change when such a change is based on logic. Of course, many times within a short life span the original design has stopped a building from being useful. But if change is accepted as a major idea in planning, then the building will have a framework capable of convertibility to take care of future needs.



The key to convertibility of areas in the Norman School lies in the simplicity of method in changing partitions and relocating utility outlets. In sketch above note the non-load bearing walls and the raised floor slab with utility mains in crawl space beneath.

Experience at Norman, Oklahoma

A good illustration of Form-Allows-Function is the Norman, Oklahoma, High School.† During a five year period, which is a short time in the life span of any building, the enrollment increased from 600 to 1,050 students. The expansion was carried out in two phases:

(1) A compact new wing with 24 academic classrooms. The addition was tied to the existing building with the least amount of disturbance or waste. Only two windows were discarded.

(2) Conversion of academic classrooms in the original building to expanded special areas. This was accomplished by enlarging the administration area and the library. The cafeteria expanded into what had been business administration classrooms. Business administration moved to the former choral room location, and the foods and science facilities took over academic classroom areas.

An original planning module combining movable partitions, artificial lighting, natural lighting, ceiling grids, non-load bearing structure, and a crawl space under the entire floor for complete freedom of pipe and electrical runs made this conversion relatively easy. In fact, the changes were so simple to make that, with the exception of special trades, the school administration made them with their own maintenance staff during the summer months. The Form-Allows-Function approach had anticipated changes such as these.

† Caudill, Rowlett & Scott and Perkins and Will, Associated Architects.

CONCLUSION

Like everyone else, we do not like to see one of our buildings demolished, and we believe it is necessary to plan today for later changes. We like to believe that 30 or 40 years from now we will have the opportunity of walking into one of our high schools and seeing complete changes in spaces from the original design—classrooms with partitions removed for large project areas, gymnasiums becoming television broadcast centers, exterior walls removed for outside covered teaching areas, or any change necessary to serve the educational process of that day.

The approach to architectural progress from the Function-Follows-Form of the classic revival has shifted to the Form-Follows-Function approach of recent times. Today, for architecture to serve a changing society, it must produce building forms which will *allow* today's functions as well as tomorrow's. Our axiom, therefore, is Form *Allows* Function.

ZONED APPROACH FOR COLLEGE MASTER PLANS

RESEARCH REPORT 15

by HERBERT PASEUR
THOMAS A. BULLOCK

CENTRAL Christian College is the outgrowth of a movement which sprang up shortly after World War II when a number of men throughout the states of Oklahoma, Kansas, Western Missouri and Northwestern Arkansas, realizing the need for more Christian colleges, acquired property in Bartlesville, Oklahoma, for establishing a college. L. R. Wilson, formerly president of Florida Christian College, was selected by the newly organized board of directors to be the first president of the college. He, along with his coworkers, first opened the doors to students on September 25, 1950.

At the end of the first school year, the college was certified for accreditation by the Oklahoma State Board of Regents for Higher Education and this certification has been maintained since that time.

In the spring of 1954, L. R. Wilson resigned as president of the college. James O. Baird, who had been serving as dean of the college, was selected as the second president. George S. Benson was appointed chancellor in the fall of 1956. He now serves in this position while continuing as president of Harding College.

In 1956 the board of directors decided, after considerable study and deliberation, to move the school to Oklahoma City, Oklahoma. In Oklahoma City it was believed that the college would be of greater service and have a greater potential for growth. A 200 acre campus site has been purchased in the northeast portion of the city. Plans are being made to open the school in its new location in September, 1958.

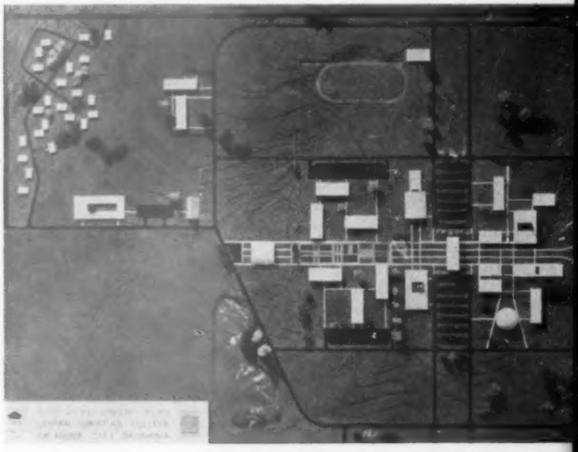
Three Major Site Areas

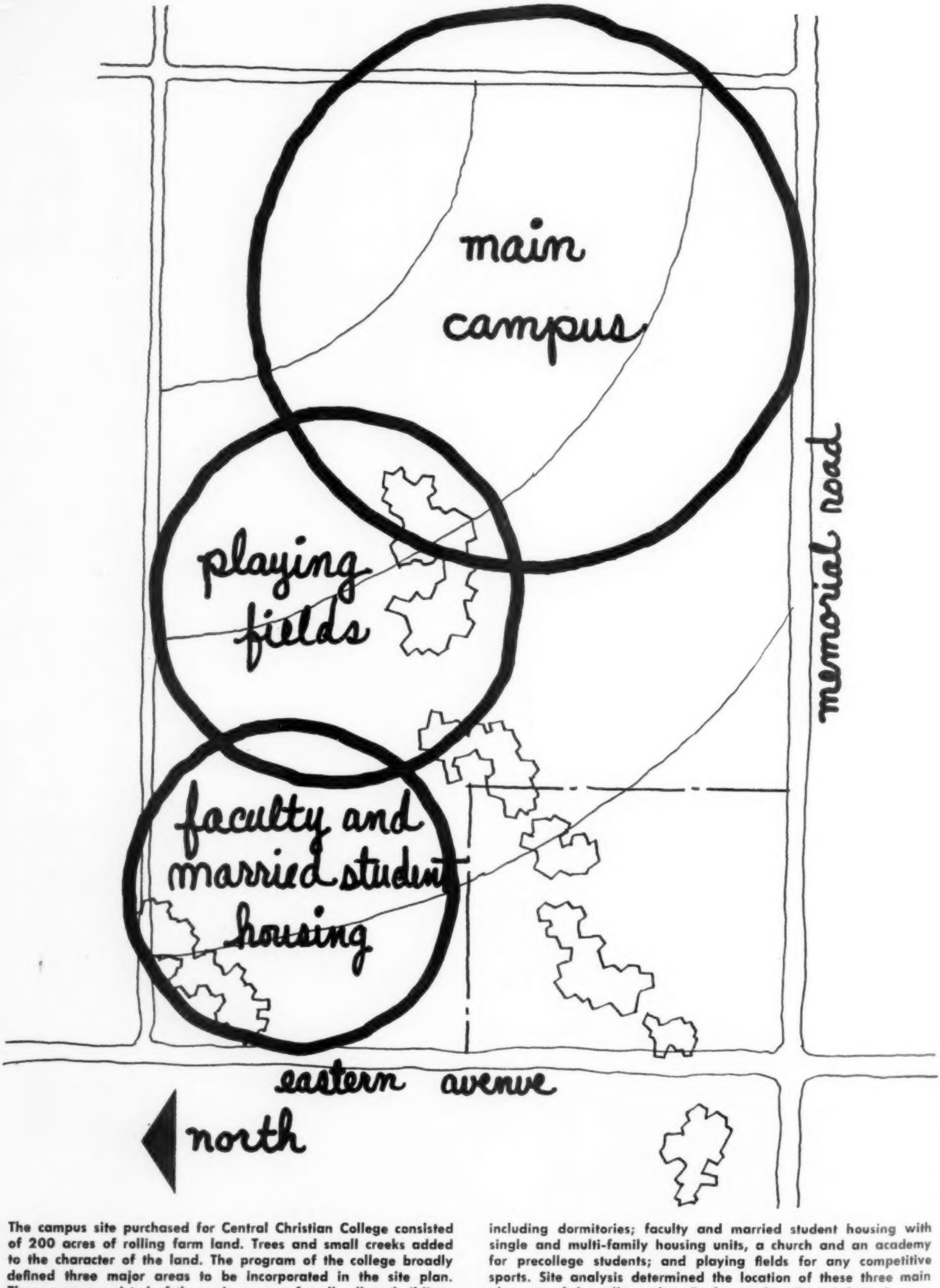
The program of Central Christian College broadly defines three major areas to be incorporated in the site plan.

THE PROBLEM:

We need the same flexibility in a college master plan that we need in the buildings themselves. Master plans that try to anticipate the exact location and size of buildings fail because of the many variables involved during the growth period. The zoned approach provides us with a broad framework within which a college can grow. The Central Christian College site development plan is an example of this approach.

Site development plan for Central Christian College was completed by means of the ZONED APPROACH.





The campus site purchased for Central Christian College consisted of 200 acres of rolling farm land. Trees and small creeks added to the character of the land. The program of the college broadly defined three major areas to be incorporated in the site plan. These areas consisted of the main campus for all college buildings including dormitories; faculty and married student housing with single and multi-family housing units, a church and an academy for precollege students; and playing fields for any competitive sports. Site analysis determined the location of these three main elements of the college plan. Further study adjusted their size.

1. *Main Campus.* This area would contain all of the college buildings, including dormitories. Campus parking would be considered essential here.

2. *Faculty and Married Student Housing.* This section is primarily residential in character, and includes single and multi-family housing units as well as a church and an academy for precollege students.

3. *Playing Fields.* Although the college does not emphasize competitive sports, an area is programmed for that purpose as this policy could change in the future.

The site is composed of 200 acres of gently rolling farm land with a small number of trees along a few creeks. High ground on the northeast slopes continually to the opposite corner, affording good natural drainage of the site.

Paved county roads bound two sides of the site and the right of way has been granted for construction of the two remaining perimeter roads. This will allow access from all sides.

Locating the Main Site Elements

Location of the three main site elements was determined by site analysis. Further study of the college program adjusted their relative size and final arrangement. The main campus will occupy the most desirable section of the site which best suits its purposes. The area has three roads, good drainage, and unlimited view to and from the campus. Objectionable noise is minimum and the higher ground is ideal for building.

Faculty and married student housing will be located in the area of the site where trees, ravines and separate access make the section adaptable for housing purposes. A relatively level area has been marked for the playing fields.

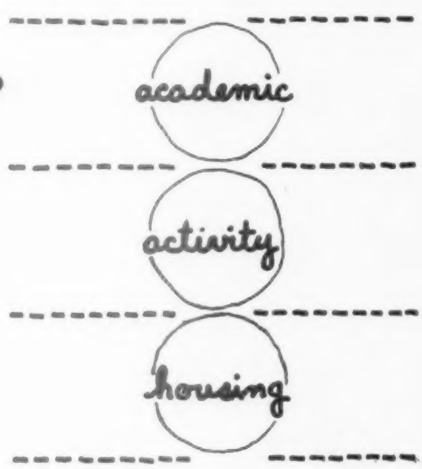
Components of the Main Campus

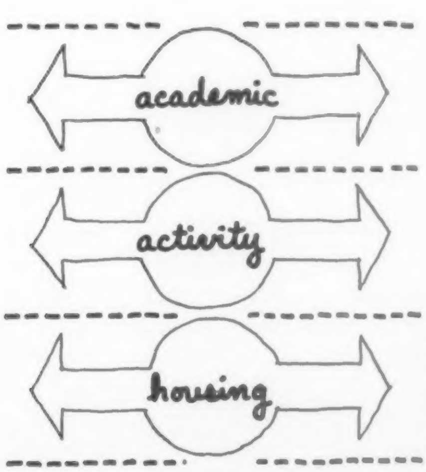
After the main campus had been located on the site, the next step was to break the zone into components. An investigation of the program requirements, research material and of existing colleges, pointed to a campus with three major building zones:

- Academic Zone
- Student Activity Zone
- Housing Zone

In establishing these zones, we studied the general objectives of the facilities, desired atmospheres, intended functions, sound, service and parking requirements, relationship to outdoor areas and other zones.

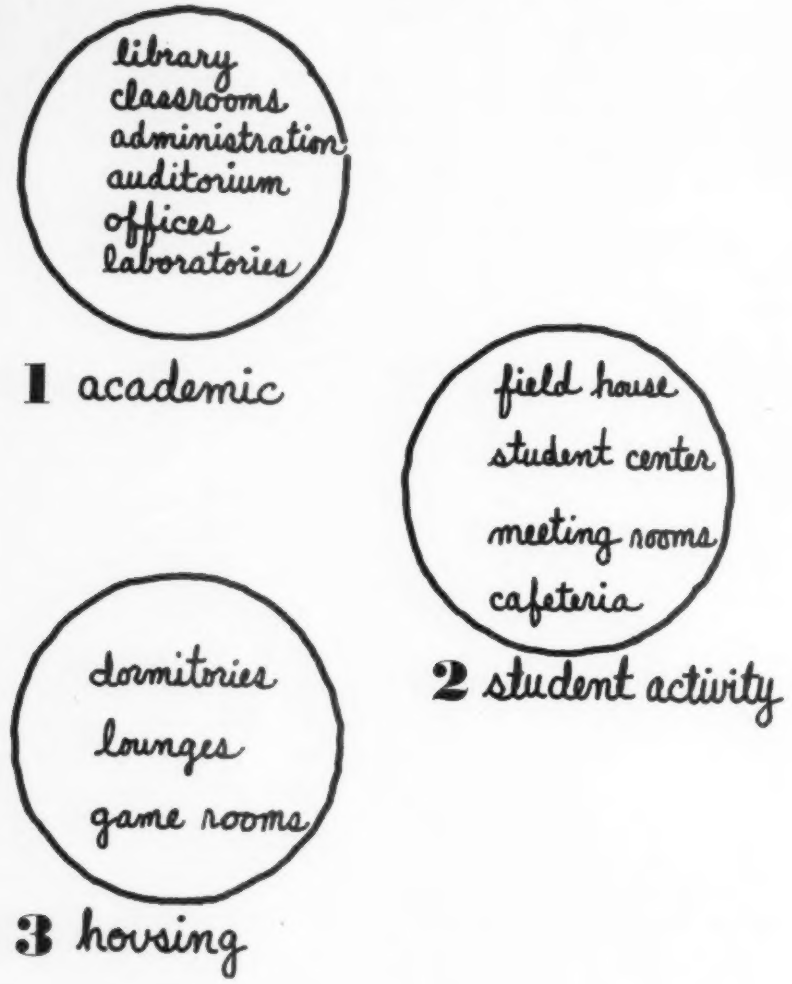
why not zone
this way to start?





and let the zones
expand without
overlapping.

Master plans cannot determine the exact location and size of all buildings which will eventually be located on a college campus. The zoned approach provides a broad framework within which a college can grow and expand without interfering with existing buildings or areas reserved for specific needs.



The academic zone of the Central Christian College campus will be the quietest section of the campus and have the least amount of service requirements. The student activity zone will serve to tie the many factions of the student body into one united group. The housing zone will be residential in character and will reflect high personal standards of living.

By examining the various parts of the college plant in regard to the criteria set forth above, each facility could be placed in its most appropriate zone.

The Academic Zone

The architectural character and planning of the academic zone should exhibit truth and order, bordering on the formality of early universities. This should be the quietest section of the campus, and have the least amount of service requirements.

Outdoor courts for meditation as well as outdoor laboratories for experiments should be provided. Parking should be convenient, but not obtrusive. This zone should have primary relationships to the student activity zone. These are the only two zones used by all persons at the college—faculty, resident students, day students and night students.

Student Activity Zone

The student activity zone serves to tie the many factions of the student body into one group. The day student feels as much a part of the college here as does the resident student. Social gatherings may accommodate two persons having coffee at the snack bar or an assembly of the entire student body in the fieldhouse. This is the college's social and student service center.

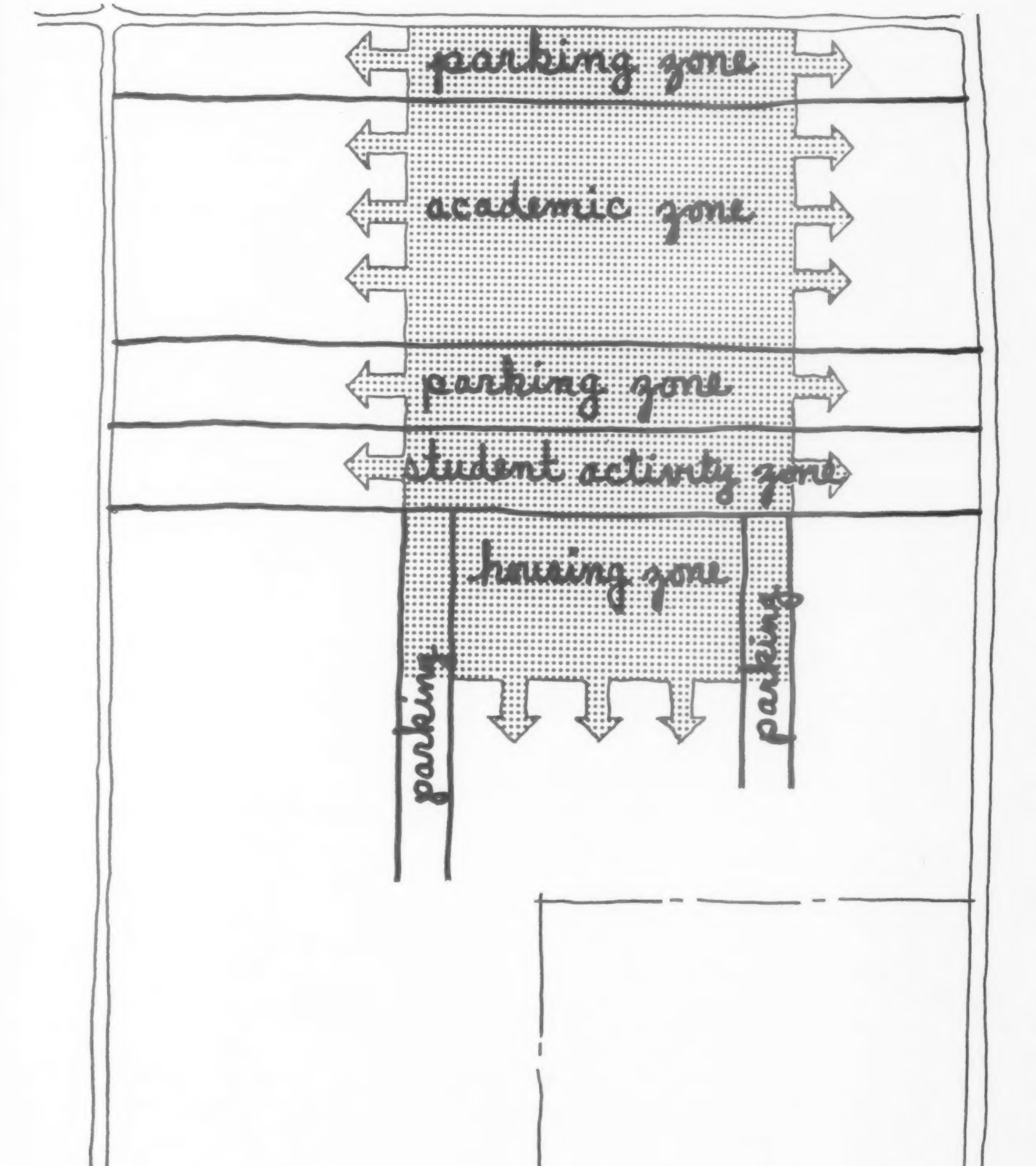
The architectural character should be keynoted with friendliness and informality. Outdoor social courts and terraces should be provided. Service, parking and noise levels are maximum in this zone. Access to the other two zones should be direct and easy.

The Housing Zone

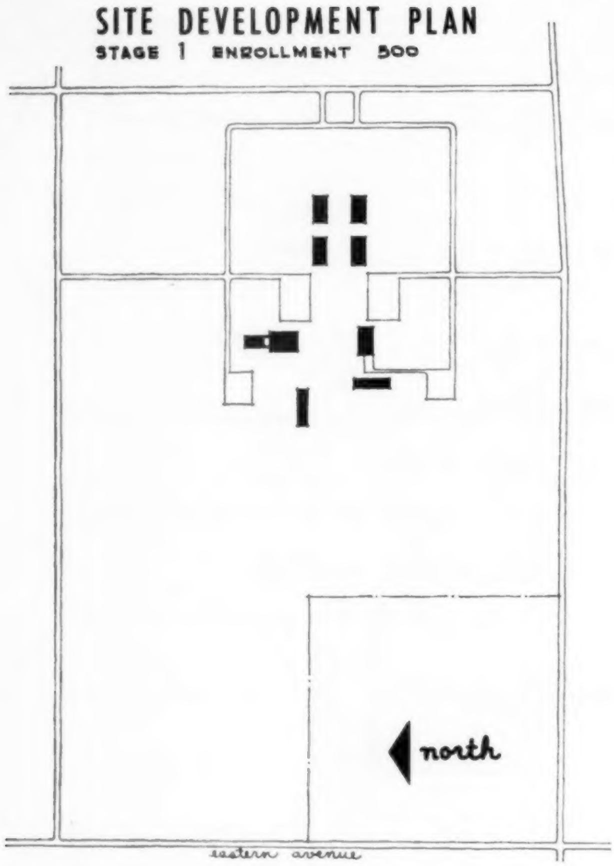
The atmosphere of the housing zone should be residential, creating an awareness of aesthetic appreciation and interest in high personal standards of living. Service and parking requirements are maximum. Noise levels are high and should be controlled. Outdoor physical education facilities should be convenient. Direct access to the student activity zone is desirable.

Research shows that most colleges have some loose system of zones—dorms are on one side of the campus and activity areas are grouped—but the framework is not rigidly defined. As the college expands, unlike areas overlap and zones become mixed.

An academic building constructed next to a gymnasium results in both buildings losing efficiency because the objectives, atmosphere, physical requirements and functions are different. These undesirable relationships occur more frequently as the campus grows.



Logical expansion of a college campus will be achieved with through-site strip zoning which permits each zone to expand in two directions. Parking zones are placed to define campus areas and provide buffers. When a well defined zoning concept is incorporated in the master plan, proper relationships are established between areas on the campus at any stage of development. The master plan for Central Christian College in Oklahoma City is built upon a concise framework of zoning. The zoning plan is contiguous with the master plan.



Stage I of Central Christian College's site development plan consists of the necessary buildings and adjuncts to accommodate an enrollment of 500 students.

Central Christian College expects to grow. The initial enrollment of 500 could increase rapidly to an enrollment of 5,000. To cope with such an enrollment increase, the campus must have a well defined zoning concept incorporated in the master plan which establishes the proper relationships between areas at *any* stage of development.

Through-Site Strip Zones

The method of through-site "strip zoning" applied to the campus will assure a logical expansion of each zone. Where colleges in the past have used zoning as a minor part of planning, the master plan for Central Christian College will be built upon a concise framework of zoning. In essence, the zoning plan *is* the master plan.

The through-site growth zones permit each zone to expand in two directions from the first stage of construction. Parking zones are placed to define campus areas and provide buffers. The ground set aside for parking would never be used for construction of any type but will be held in reserve for future parking requirements.

This system of zoning, combined with a network of campus roads, serves as the basis for design of the master plan.

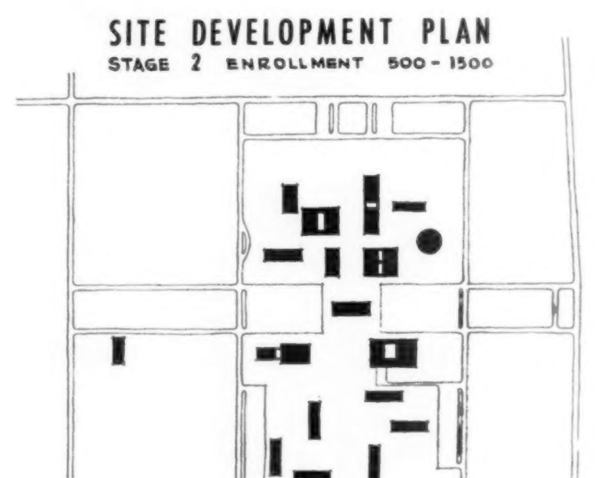
The solution of zoning layout and the final development of the site plan for Central Christian College were carried out simultaneously. We believe that the need or desire to place a building out of its respective zone might not occur because of the strong definition of the areas.

The exact location, shape and size of future buildings is not nearly as important as making sure that the facilities are located in the right zone with the proper atmosphere and relation to other buildings. The very nature of the zone divisions promotes an organization of the units while discouraging violations.

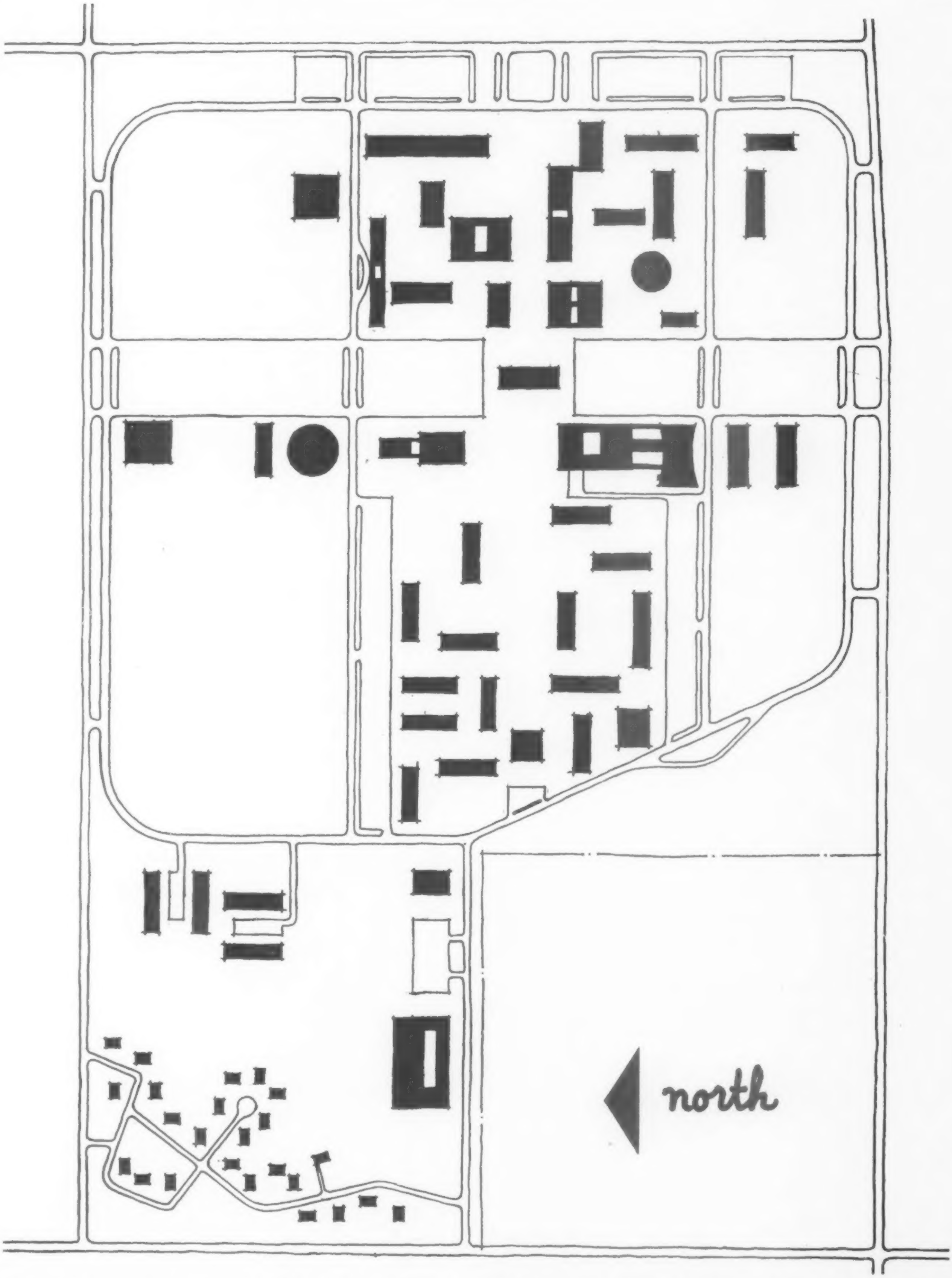
Zoned Approach for Expansion

Assuming that Central Christian College will grow and, through the use of multi-story buildings, reach an enrollment of 5,000 or even 15,000 for that matter, we know that—

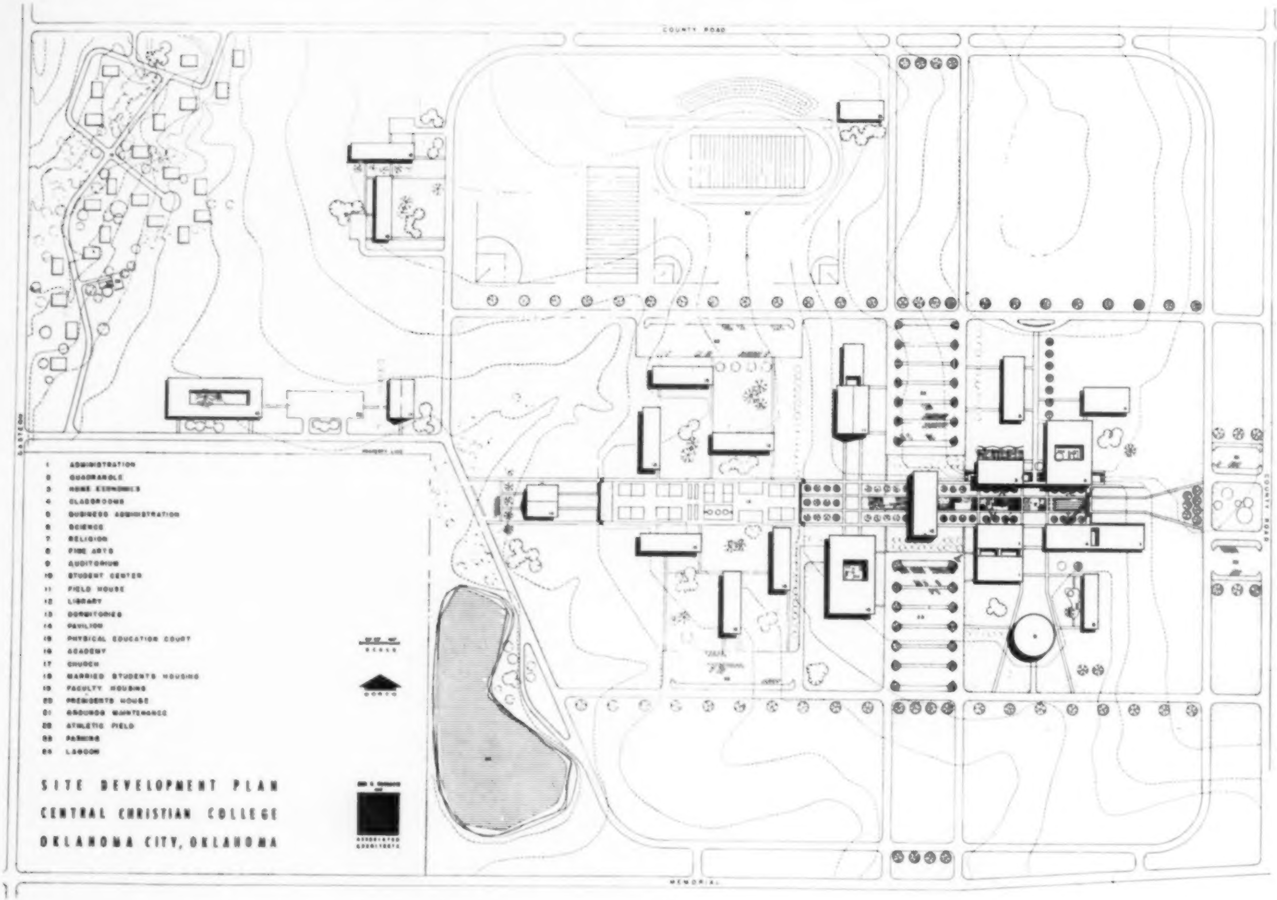
- The ZONING CONCEPT is still workable. If college educational changes dictated a major emphasis or de-emphasis in some of the zones, overlapping could probably occur. But this would be minor in relation to the total physical plant.



Stage II represents that period when the college will grow from a small college to a large college. This growth will be a continual process and the intervening enrollments, whether of 600, 700, 1,000, etc., will be as complete and important as the 1,500 enrollment.



Stage III in the site development of Central Christian College indicates the site capacity in respect to buildings. It is strictly a guess as to actual conditions which might effect Stage III planning. However, the basic ideas of the master plan will still be valid. It should be emphasized that the campus zones and the road development are the master plan. In any future **building expansion** after Stage I, the exact location, shape or size **of facilities is guesswork.** They will probably differ from any of **today's conceptions. It** is more important to make sure that facilities **will be in the right** zone with proper atmosphere and relation **to other buildings.**



Site development plan for Central Christian College, as completed by Caudill, Rowlett, Scott and Jack R. Nusbaum, associated architects, consists of facilities for administration, home economics, classrooms, business administration, science, religion, fine arts, auditorium, student center, field house, library, dormitories, academy, church, married student housing, faculty housing, president's house, athletic field and parking.

- Parking can expand with the enrollment. The number of students driving cars can increase and still be accommodated within the strip zones. If the ratio decreases and all of the area isn't needed, then the open ground is still a good buffer and protection against future parking requirements.
- The outside perimeter road becomes the principal route of circulation around the campus, independent of the public road development.
- The inner perimeter road becomes a secondary loop and, because of this secondary role, allows buildings to be placed on both sides of the road. Use of restrictions may be advisable to minimize pedestrian-auto conflict.

The need for college master plan flexibility has been emphasized time and time again in our research. We feel that the ZONE APPROACH achieves this flexibility.

CUMULATIVE INDEX BY AUTHORS

All authors who have contributed to this edition and to the previous five (XXV, 1953, through XXX, 1958) are included in the index. An index of articles by subject classification follows on page 410. Complete indexes to XVII, 1945, through XXV, 1953, can be found in XXV, 1953, beginning on page 8. Complete indexes to XI, 1939, through XVI, 1944, are found in XVI, on page 5. Complete indexes to I, 1928, through X, 1938, are to be found in X, 1938, beginning on page 9.

CUMULATIVE INDEX BY SUBJECTS

The subject index includes all articles in the present edition and those for the five preceding years (XXV, 1953, through XXX, 1958). Complete indexes to XVII, 1945, through XXV, 1953, can be found in XXV, 1953, beginning on page 8. Complete indexes to XI, 1939, through XVI, 1944, are to be found in XVI, 1944, on page 5. Indexes to I, 1928, through X, 1938, are located in X, 1938, on page 9.